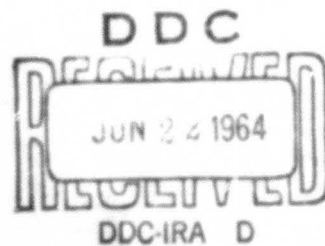


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RADIOLOCATION RESEARCH LABORATORY

TECHNICAL NOTE

Publication No. RRL 230

**A PROGRAM FOR PLOTTING THE RADIOLOCATION
PREDICTIONS AND ANALYZING THEIR ERRORS**

by

Roger A. Vossler

March 1964

Supported by

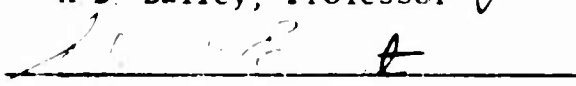
**U. S. Army Electronics Research and Development Laboratories
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ACKNOWLEDGEMENTS

This program is a result of a problem suggested by Mr. Richard F. Donnelly.

The author wishes to thank Mr. Vincent Mrstik for preparing the paper tapes which are used to plot the coordinate axes for the graphs prepared by this program.

ABSTRACT

This program analyzes the errors of radiolocation predictions and evaluates the average range errors, the root mean square range error, and ten, twenty, and thirty minute cumulative averages of the range errors for both the following:

- a) Range errors of the predicted range with respect to the true range of the transmitter where range is measured from the receiver.
- b) Range errors of the predicted transmitter position where range is measured from the known transmitter location.

In addition to this, the computer punches up paper tapes for operating an X-Y plotter. Two types of graphs are obtained in this manner. One is a plot of predicted range error vs. time where range is measured from the receiver. The other is a plot of the range and bearing of the predicted transmitter position with respect to the known transmitter location. The latter graph is referred to as a target plot. This program is coded in SPAR. The computer involved in this case is a Control Data Corporation G-20A using the SPACE programming system.

1. PROBLEM STATEMENT

Measurements of the vertical angle of incidence and azimuth of an arriving HF radio signal are made with an interferometer. The vertical angle of incidence and vertical incidence ionogram data are used to predict the range or range error in the case where the location of the transmitter is actually known. The azimuth, time, and interferometer predictions from the ionogram studies and other information such as the propagation mode, provide the input to this program. The program analyzes the errors of radiolocation predictions and evaluates the range errors, the root mean square range error, and ten, twenty, and thirty minute cumulative averages of the range errors for both the following:

- a) Range errors of the predicted range with respect to the true range of the transmitter where range is measured from the receiver.
- b) Range errors of the predicted transmitter position where range is measured from the known transmitter location.

In addition to this, the computer punches up paper tapes for operating an X-Y plotter. Two types of graphs are possible. The first is a plot of the range errors mentioned in (a) above as a function of time (see Figure 3). The second is a plot of the range and bearing of the predicted transmitter position from the true transmitter location (see Figure 6). This is referred to as a target plot. In addition calculations are made to obtain the range errors described in (a) and (b) above which are then averaged according to the following scheme:

- a) Ten minute cumulative averages of the range error starting on every ten minutes beginning with the period during which data was first taken.
- b) Same as a) except for twenty minutes.
- c) Same as a) except for thirty minutes.
- d) Average range error.
- e) Root-mean-square range error.

As far as the 10-, 20-, and 30-minute cumulative averages are concerned, an hour is divided into fixed time intervals: i. e., 6-10 minute intervals, 3-20

minute intervals, and 2-30 minute intervals. These intervals are built into the program and are not available to the operator. For example, consider that the first data was recorded at hour $X + 45$ minutes. The printout starts with hour X . The 10 minute cumulative average starts with $X + 40$ as does the 20 minute cumulative average. The 30 minute cumulative average starts with $X + 30$. As was previously implied, the cumulative averages and final averages are printed by a line printer. Since the graphs are plotted on blank paper, the proper coordinates must be plotted on the paper also. This is done by separate paper tapes whose use is described later under Operating Instructions. Because the coordinates are plotted according to a certain scale, it is necessary that the data also conform to this scale which is as follows:

- a) Range Error vs. Time Plots: 50 kilometers and one hour are equivalent to 6666 and 8000 plotter units respectively.
- b) Target Plots: 100 kilometers are equivalent to 8888 plotter input units.

The target plot has its origin at the center of the graph paper, therefore, the plotter is zeroed at this point (see Figures 4 and 5). It is not necessary to change the calibration or zero point of the X-Y plotter for the Range Error vs. time plot as the horizontal centerline of the graph represents 0 kilometer range error and the vertical centerline represents the beginning of the second hour as the time axis of the Range Error plot covers two hours. The calibration for the X-Y plotter is discussed in the operating instructions for this program. A total day's data may easily run more than two hours in which case the data is plotted on succeeding sheets of graph paper. There is, however, no overlapping of the graphs. Note that the odd hours have negative X components but this is resolved by the program. Also in this general problem statement, it is worthwhile to point out some of the contingencies of the data which have been designed into the program. These are as follows:

- a. Target Plot: Sometimes the point to be plotted exceeds some maximum range (greater than ± 75 kilometers north and south and greater than ± 100 kilometers east and west) with respect to the true transmitter position. In this case, this particular point's range and bearing plus some related information is printed out and not plotted. This point, however, is included in the cumulative averages.

- b. **Range Error vs. Time Plot:** Sometimes the range error exceeds ± 50 kilometers in which case the error and time are printed along with some related information and is not plotted. However, it is included in the cumulative averages.
- c. **Raw Data:** Sometimes there are no range predictions available when this data is required. In this event, the data card is read but ignored on input. The reason that data cards of this nature are in the data decks is that part of the input data will be punched up and used by programs, other than this one, which are still in the developmental stages.
- d. An identification, which labels the data following it, is punched in the paper tapes prepared by the computer. The tapes are punched with each class following sequentially and in the following format. For each class: eighteen inches of leader, the data class identification, six inches of blank tape, and then the data block itself followed by a stop code for the plotter.
- e. If no data exists for a particular class or graph (i. e. , Range error data available for 1st and 2nd hours, none for third and fourth, but finally some for the fifth hour) appropriate messages are punched on paper tape.
- f. **Printout, Cumulative Averages:** The value of the average, the number of datum used in computing the average, and the time of the last datum used in computing that average are printed for the ten, twenty, and thirty minute averages in a suitable format.

2. COMPUTATIONAL METHODS

With the exception of the cumulative averages no equations are discussed in this section. The bulk of the arithmetic is performed by the RANGE and COORD subroutines described by RRL Publication No. 231. The remaining mathematics consist of simple trigonometric functions which are readily apparent from the flowchart and listing of this program. Therefore, most of the program involves manipulation of the data according to certain techniques which are outlined and described in this section. Basically the raw data is read in and stored on magnetic tape which is then scanned seven times for each type of plot. The data is scanned once for computing the cumulative average and then once for each of the six data classes which are determined by the antenna pair and propagation mode associated with each sub-group of raw data.

The program is divided up into five sections whose functions are described as follows:

A. Section I

1. Reads two cards of initial data whose contents are described later under Input and Output.
2. Converts the longitude and latitude of the receiver and transmitter from degrees, minutes, and seconds into degrees and fractional degrees which is then converted into radians.
3. Computes the true range between the receiver and the transmitter which is stored for future reference using the RANGE subroutine.
4. Determines the parity (even or odd hours) of the reference time of the initial data. This reference time becomes the basis of a relative time reference hour. The time in hours and fractional hours which appears in the various program printouts in time relative to the initial time reference, i. e., time reference of 2100 hours and a relative time of 1.75 hours imply that the true time is 21:45:00; a time reference of 2200 hours and a relative time of 3.75 hours imply that the true time is 23:45:00
5. Reads in the raw data, packs this in a 256 word temporary holding zone, which when full is dumped onto magnetic tape. When the last of the raw data is read, an "end" code is placed behind the final data all of which is stored on magnetic tape. As the data is read in, the following tests and conversions are made:
 - a. If the predicted range is to be used and is zero, this data card is thrown out.
 - b. Time is converted to fractional hours and added to the either odd or even time reference and stored thus. At each hour change, the time reference is incremented accordingly.
 - c. If time skips an hour, this fact is processed and the time reference is incremented accordingly.

B. Section II

1. Prints the program heading and the proper heading for the cumulative averages currently being computed.
2. Checks to see which plot type is currently being analyzed and on the basis of this proceeds to either (a) or (b) as follows:
 - a. Target Plot: computes the distance between the predicted transmitter position which is then fed, along with the current time, to the cumulative average machinery. The bearing of this range is computed here also but is not used. To obtain these results the program proceeds as follows:
 1. If range error is given, it is added to the true range between the receiver and the transmitter to obtain the predicted range.

2. If the predicted range between the receiver and transmitter is given, it is used directly.
 3. The COORD subroutine is now used to obtain the coordinates of the predicted transmitter pointer location.
 4. These coordinates along with the coordinates of the true transmitter position are fed into the RANGE subroutine, the output of which is the desired distance between the predicted and true transmitter locations.
 5. The coordinates of the true transmitter location are then subtracted from the predicted transmitter position and the relative longitude and latitude obtained are used to obtain the bearing of the range computed in step No. 4. (See program flowchart and Figure 1 for details)
- b. **Range Error Plot** determines the range error, which, along with the current time, is fed to the cumulative average machinery. If the range error is given, nothing needs to be done, the range error is used directly. If the predicted range is given, the predicted range minus the true range gives the desired range error. (See program flowchart and Figure 1 for details)
3. Scans the raw data on magnetic tape, computes the cumulative averages and prints the results in a suitable format as they are computed. The cumulative averages are determined by

$$\bar{X} = \frac{1}{n} \sum_{i=1}^n X_i \quad \text{where } \bar{X} \text{ is the cumulative average} \quad (1)$$

A ten-minute average involves all the points within a ten minute interval. Then it is reset and started over. The same applies to the twenty and thirty-minutes averages.

4. Computes a total average and RMS average which are printed out along with the total number of points used in computing these averages. The total average is computed over the whole data run from (1) and is not reset at the end of every specified time interval. The final RMS average, S , uses (1) as follows:

$$S = \left[\frac{1}{n} \sum_{i=1}^n (X_i - \bar{X})^2 \right]^{1/2}$$

$$= \left[\frac{1}{n} \sum_{i=1}^n (X_i^2 - 2X_i\bar{X} + \bar{X}^2) \right]^{1/2}$$

$$= \left[\frac{1}{n} \sum_{i=1}^n X_i^2 + \frac{n\bar{X}^2}{n} - \frac{2\bar{X}}{n} \sum_{i=1}^n X_i \right]^{1/2}$$

$$\text{Therefore } S = \left[\frac{\sum_{i=1}^n X_i^2}{n} - \bar{X}^2 \right]^{1/2} \quad (2)$$

This final equation is the one solved by the program.

C. Section III

1. Punches out the required amount of leader and the proper identification for each class of data.
2. Contains the machinery for scanning the raw data picking up only the data required by the current class. If none is found, the message "NO DATA OF THIS TYPE" is punched on the paper tape along with a stop code for the plotter.
3. Transfers to the next section, if good usable data is picked up in the raw data scan, where it is processed.
4. Punches remainder of data contained in a punch zone (described later) plus a stop code for the X-Y plotter when the end of the raw data is detected.
5. Sets up the proper paper tape identification for the next data class to which it then proceeds to scan.
6. Transfers to an exit zone (See Section V), after scanning the last data class, which determines whether another plot is desired. If so, the program is restarted through channel two (Range error plot) and if not, terminates the program.

D. Section IV - checks to see which plot type is currently being processed and on the basis of this proceeds to either (1) or (2) as follows:

1. Target Plot
 - a. Computes the values of range and bearing as described in Section II paragraph 2a.
 - b. Checks the values of the X and Y components of the range and bearing of the predicted transmitter location to determine whether or not the X and Y components are within certain limits. If these limits are exceeded, the data is printed out and not processed beyond this point.
 - c. Scales the proper values of the X and Y components, assuming that they fulfilled the conditions of the previous step, for the X - Y plotter and restores these numbers into locations common with the Range error channel of this section and exits to the next section.

2. Range Error Plot

- a. Computes the value of the range error as described in Section II, paragraph 2b.
- b. Checks the value of the range error to determine whether or not the range error exceeds a certain limit. If so, the data is rejected and if not, the program proceeds to c.
- c. Determines upon which two-hour-graph the first time for a particular graph falls. For each two-hour-graph that there is no data to plot, the message "NO DATA THIS GRAPH" is punched into the paper tape followed by a stop code for the X - Y plotter.
- d. Determines the parity of the relative time in order to establish an odd hour time reference and an even hour time reference. This step and the preceding one (c & d) are executed only for the first time through on each particular data type.
- e. Compares the current relative time with the odd and even time references. If the current time is odd, it is converted into a suitable negative "time" which fulfills previously mentioned criteria. If the current time is even, no conversion is made. This section also contains the machinery for incrementing the odd and even reference time as necessary. Machinery is also built in to determine if the current time skips a two-hour-graph. If this is true, a suitable message ("NO DATA THIS GRAPH") is punched into the paper tape followed by a stop code. (Details are evident from the flowchart and listing.)
- f. Scales the proper values of range-error and time for the X - Y plotter and restores these numbers into locations common with the Target Plot channel of this section and exits to the next section.

E. Section V

1. Receives the number pairs from Section IV and breaks these down into a sign character and single integers stored in sequential memory locations. (As a result of the scaling done in section IV, the numbers coming into Section V are in the form +dddd, a sign and four digit integer.)
2. Converts the integers into the corresponding characters required by the X - Y plotter.
3. Formats these characters for the X - Y plotter.
4. Contains the machinery for accumulating the character strings in a punch zone which when full is dumped onto paper tape.
5. Determines finally whether or not a second plot is desired and then either exits to SPACE or restarts the program with the running averages (Section II).

In order to operate the X-Y plotter to plot one point, the following information is needed and is entered in the order shown.

- | | | |
|----------------------|---|---------------------------------------|
| 1. X follows | } | X coordinate |
| 2. Sign | | |
| 3. Thousands digit | | |
| 4. Hundreds digit | | |
| 5. Tens digit | | |
| 6. Units digit | | |
| 7. Y follows | } | Y coordinate |
| 8. sign | | |
| 9. Thousands digit | | |
| 10. Hundreds digit | | |
| 11. Tens digit | | |
| 12. Units digit | | |
| 13. Plot instruction | | instructs plotter to plot this point. |

Essentially, then, Section V takes two four-digit integers plus signs and translates these into the above format. In the event that one of the digits can not be translated into the corresponding plotter character, the message "TRANSLATOR ERROR" will appear on the line printer and that data is rejected.

3. LIMITATIONS AND ACCURACY

Although the arithmetic of the two subroutines, RANGE and COORD, is double precision, the arithmetic of this control program is all single precision which limits the accuracy to six decimal digits plus a two digital exponent. This accuracy is more than sufficient since the resolution of the plotter is limited to four significant digits and most of the input data has the same accuracy. Other limitations are discussed in the report on the subroutines, RRL Publication No. 231, but normally these will not be of interest. This program assumes the following sign conventions on longitude and latitude:

- a. longitude east of Greenwich is positive
- b. longitude west of Greenwich is negative
- c. latitude north of the Equator is positive
- d. latitude south of the Equator is negative

In the operation of the X-Y plotter using the proper tapes prepared by this program, there is no stop code after the second hour of each two hour plot of the Range Error vs. Time plot. Therefore, when this hour change occurs, the operator must stop the plotter's paper tape reader and change the sheet of graph paper, otherwise the third and fourth hour, etc. will be plotted over the first and second hour's data, etc. This program will process a data run of up to eight hours duration; this is more than anticipated at the present.

4. COMMON STORAGE AND INDEX REGISTERS

This program requires fourteen memory locations of common storage which are used for communicating with the RANGE and COORD subroutines. The program uses five index registers but no common index registers.

5. OPERATING INSTRUCTIONS - I/O DESCRIPTIONS

The program reads in two cards of initial data which contain the following information.

A. First card

- | | | |
|---|---|--------------------|
| 1. Degrees | } | Receiver longitude |
| 2. Minutes | | |
| 3. Seconds | | |
| 4. Degrees | } | Receiver latitude |
| 5. Minutes | | |
| 6. Seconds | | |
| 7. Time Reference - Hour in which data begins | | |
| 8. Time Reference - Some time in minutes equivalent to one minute less the time on the first data card (i.e. if time on first card is 5.06 minutes, this time reference should be 4.06, etc.) | | |
| 9. Plot - type of plots desired from the program:
This will be an integer 1, 2, or 3 signifying: | | |

- 1 = Target plot only
- 2 = Range Error plot only
- 3 = both Target plot and Range Error plot in that order.

B. Second card

- | | | |
|------------|---|-----------------------|
| 1. Degrees | } | Transmitter longitude |
| 2. Minutes | | |
| 3. Seconds | | |
| 4. Degrees | } | Transmitter latitude |
| 5. Minutes | | |
| 6. Seconds | | |

The remaining cards, which vary in number, contain the raw data which is to be processed.

- | | | |
|--|---|--|
| 1. Azimuth α | } | Punched up by computer interferometer program. |
| 2. Time (in minutes) | | |
| 3. Control Number A | | |
| 4. Predicted Range | } | punched by human operator |
| 5. Range Error | | |
| 6. Control Number B | | |
| 7. Control Number C | | |
| 8. Letters SKIP if time slips an hour | | |
| 9. Letters END to denote end of raw data | | |

The program uses either Predicted Range or Range Error. If Predicted Range is used, enter 0.0 in range error field; if Range Error is used, enter 0.0 in predicted range field.

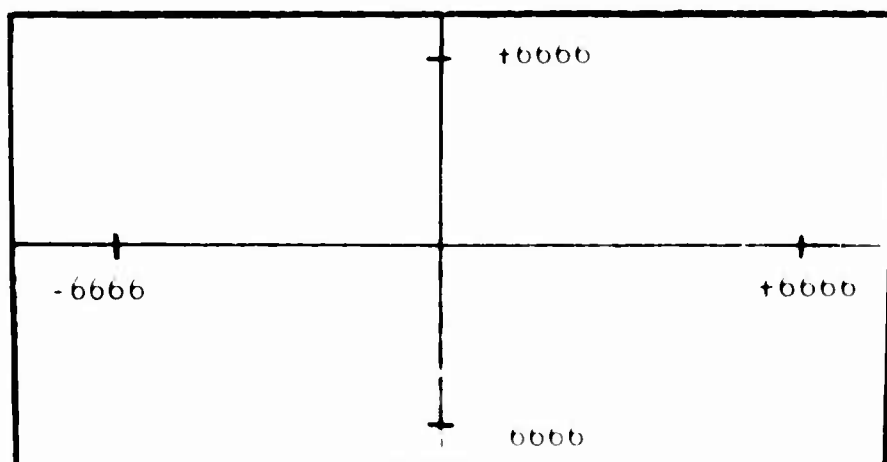
The Control Numbers have the following significance:

- A = 1: 0 - 120 Interferometer Antenna pair type data.
- A = 2: 0 - 240 Interferometer Antenna pair type data.
- B = 1: Propagation mode one hop E type data.
- B = 2: Propagation mode two hop E type data.
- B = 3: Propagation mode one hop F type data.
- C = 1: Predicted Range to be used for this data.
- C = 2: Range Error to be used for this data.

Normally **SKIP** and **END** are absent from these cards. **SKIP** is punched in columns 73-76 of the data card only if time skips one hour. **END** punched in columns 73-80 denote the end of the raw data. Upon detecting **END** on a data card, the computer will begin to process the data read in prior to this card. See Figures 2a and 2b for data card formats.

The calibration procedures for the X-Y plotter are adequately explained in two instruction manuals supplied with this instrument. For the purposes of this program, the plotter is zeroed in the center of a sheet of graph paper and the maximum length available for the positive ordinate axis is made equivalent to 6666 plotter units which implies that the maximum length of the negative ordinate axis is -6666 plotter units. The length of the ordinate axis is then made equivalent to 6666 plotter units on the abscissa (See diagram below). This completes the calibration of the X-Y plotter for both the Target and Range Error vs Time plots. It may be necessary to check this calibration from time to time during the course of plotting a large number of graphs.

CALIBRATION DIAGRAM



11 x 17 graph
paper

The coordinates are then plotted using an appropriate paper tape followed by the actual data.

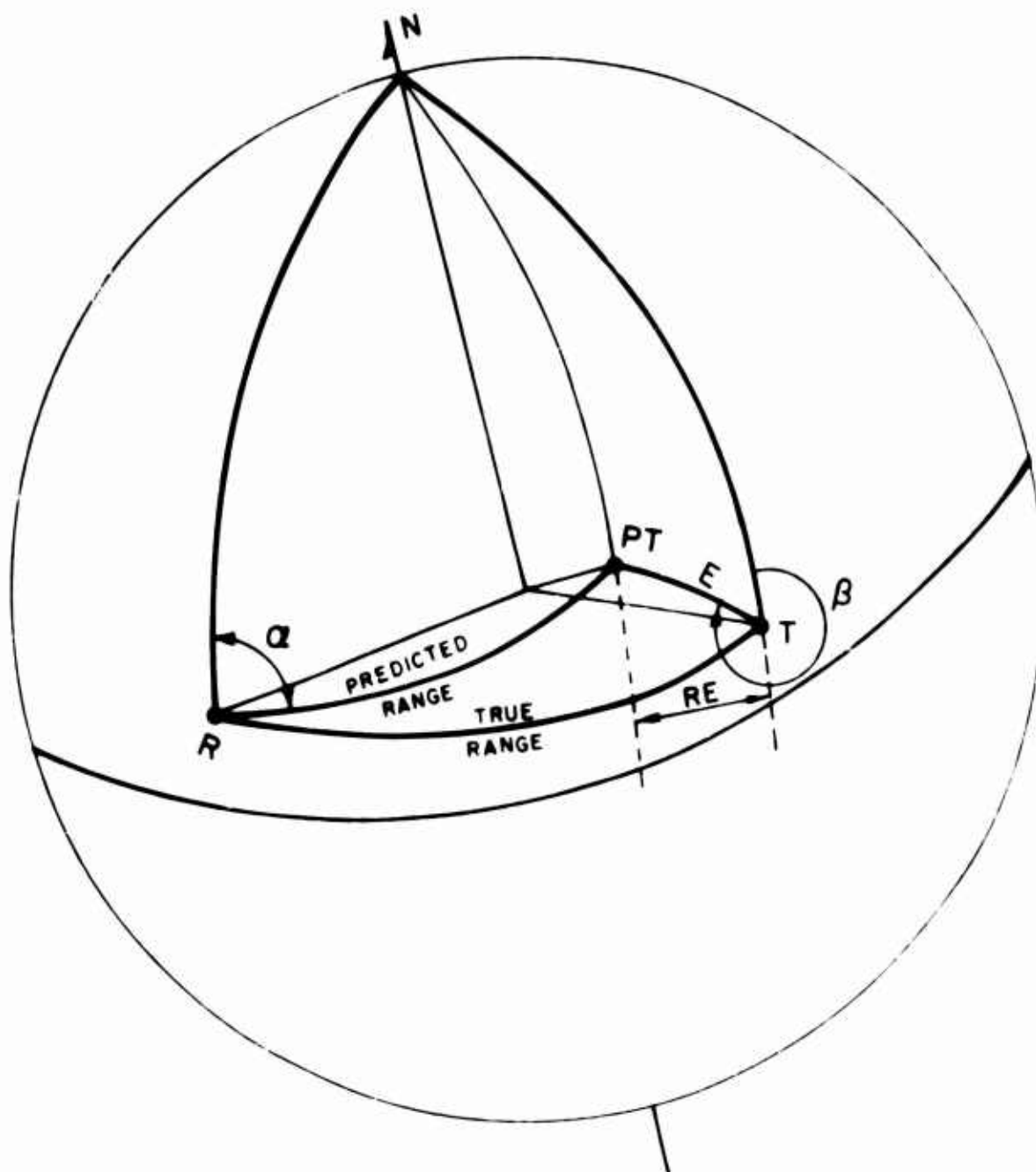


Figure 1. Where: R is the receiver position.

T is the transmitter position.

α is the azimuth of the incoming radiowave.

PT is the predicted transmitter position.

E is the distance between the predicted and the true transmitter position.

β is the bearing of E.

RE is the range error between the true and the predicted transmitter position.

The predicted range and true range are as noted above.

LONGITUDE			LATITUDE			REF TM	OLD TM	NOT USED	PROT
DEGREE	MIN.	SEC	DEGREE	MIN.	SEC				
LN GR 1	LN GR 2	LN GR 3	LAT R 1	LAT R 2	LAT R 3				
0000000	0000000	0000000	0000000	0000000	0000000	000000	000000	000000	000000
1 2 3 4 5 6 7	8 9 10 11 12 13 14	15 16 17 18 19 20 21	22 23 24 25 26 27 28	29 30 31 32 33 34 35	36 37 38 39 40 41	42 43 44 45 46 47	48 49 50 51 52	53 54 55 56 57	58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80
1111111	1111111	1111111	1111111	1111111	1111111	111111	111111	111111	111111
2222222	2222222	2222222	2222222	2222222	2222222	222222	222222	222222	222222
3333333	3333333	3333333	3333333	3333333	3333333	333333	333333	333333	333333
4444444	4444444	4444444	4444444	4444444	4444444	444444	444444	444444	444444
5555555	5555555	5555555	5555555	5555555	5555555	555555	555555	555555	555555
6666666	6666666	6666666	6666666	6666666	6666666	666666	666666	666666	666666
7777777	7777777	7777777	7777777	7777777	7777777	777777	777777	777777	777777
8888888	8888888	8888888	8888888	8888888	8888888	888888	888888	888888	888888
9999999	9999999	9999999	9999999	9999999	9999999	999999	999999	999999	999999

LONGITUDE			LATITUDE			REF TM	OLD TM	NOT USED	PROT
DEGREE	MIN.	SEC	DEGREE	MIN.	SEC				
LN GT 1	LN GT 2	LN GT 3	LAT T 1	LAT T 2	LAT T 3				
0000000	0000000	0000000	0000000	0000000	0000000	000000	000000	000000	000000
1 2 3 4 5 6 7	8 9 10 11 12 13 14	15 16 17 18 19 20 21	22 23 24 25 26 27 28	29 30 31 32 33 34 35	36 37 38 39 40 41	42 43 44 45 46 47	48 49 50 51 52	53 54 55 56 57	58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80
1111111	1111111	1111111	1111111	1111111	1111111	111111	111111	111111	111111
2222222	2222222	2222222	2222222	2222222	2222222	222222	222222	222222	222222
3333333	3333333	3333333	3333333	3333333	3333333	333333	333333	333333	333333
4444444	4444444	4444444	4444444	4444444	4444444	444444	444444	444444	444444
5555555	5555555	5555555	5555555	5555555	5555555	555555	555555	555555	555555
6666666	6666666	6666666	6666666	6666666	6666666	666666	666666	666666	666666
7777777	7777777	7777777	7777777	7777777	7777777	777777	777777	777777	777777
8888888	8888888	8888888	8888888	8888888	8888888	888888	888888	888888	888888
9999999	9999999	9999999	9999999	9999999	9999999	999999	999999	999999	999999

Figure 2a. Initial Data Cards (only two required for one data run.)

ALPH AZIMUTH	TIME TIME	PR PREDICTED RANGE	RE RANGE ERROR	NOT USED	SKIP	END
0000000000	0000000000	0000000000	0000000000	0000000000	0000	0000
1 2 3 4 5 6 7 8 9 10	11 12 13 14 15 16 17 18 19 20	21 22 23 24 25 26 27 28 29 30	31 32 33 34 35 36 37 38 39 40	41 42 43 44 45 46 47 48 49 50	51 52 53 54 55 56 57 58 59 60	61 62 63 64 65 66 67 68 69 70
1111111111	1111111111	1111111111	1111111111	1111111111	1111111111	1111111111
2222222222	2222222222	2222222222	2222222222	2222222222	2222222222	2222222222
3333333333	3333333333	3333333333	3333333333	3333333333	3333333333	3333333333
4444444444	4444444444	4444444444	4444444444	4444444444	4444444444	4444444444
5555555555	5555555555	5555555555	5555555555	5555555555	5555555555	5555555555
6666666666	6666666666	6666666666	6666666666	6666666666	6666666666	6666666666
7777777777	7777777777	7777777777	7777777777	7777777777	7777777777	7777777777
8888888888	8888888888	8888888888	8888888888	8888888888	8888888888	8888888888
9999999999	9999999999	9999999999	9999999999	9999999999	9999999999	9999999999
1 2 3 4 5 6 7 8 9 10	11 12 13 14 15 16 17 18 19 20	21 22 23 24 25 26 27 28 29 30	31 32 33 34 35 36 37 38 39 40	41 42 43 44 45 46 47 48 49 50	51 52 53 54 55 56 57 58 59 60	61 62 63 64 65 66 67 68 69 70

Figure 2b. Data Card Sample.

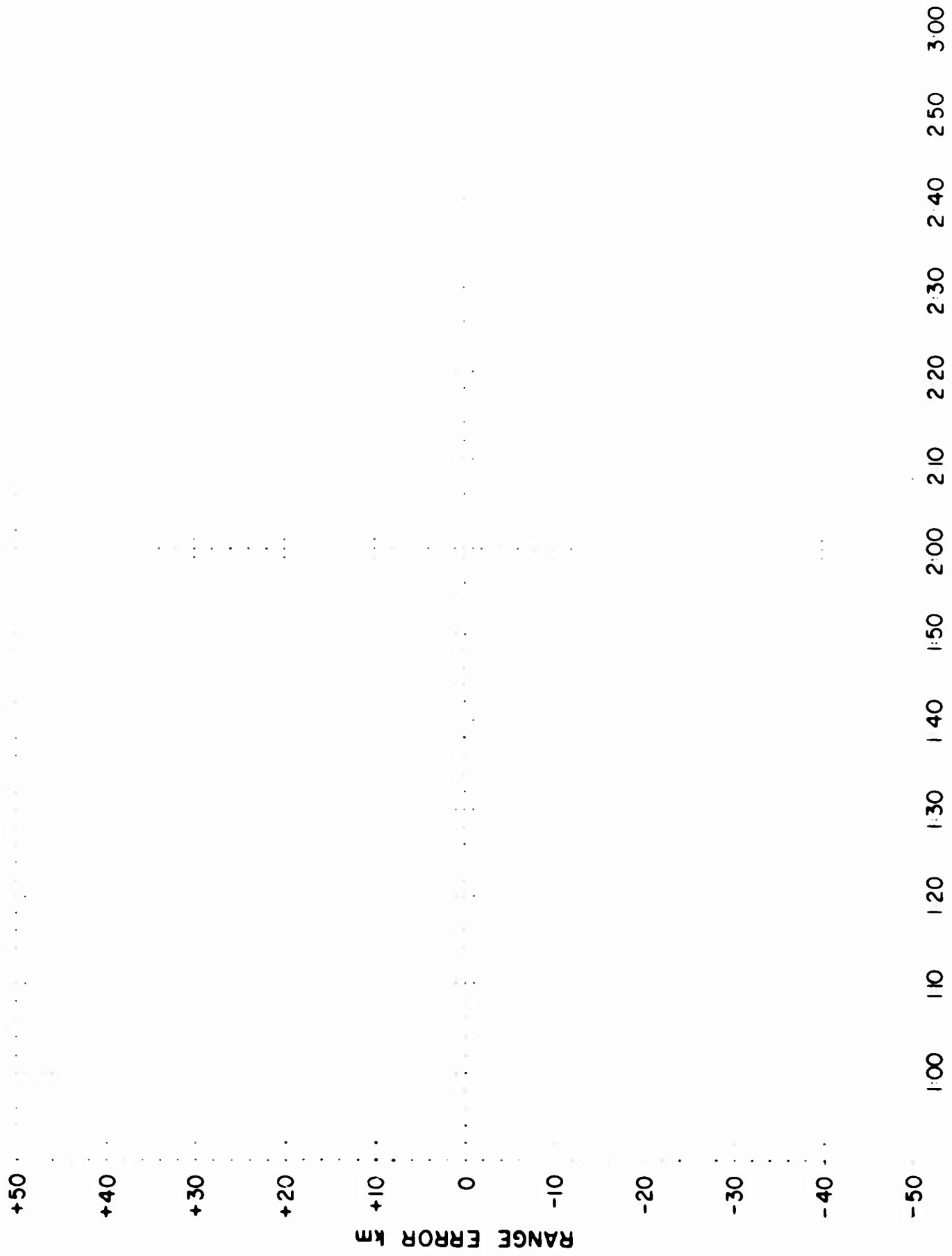


Figure 3a. Range Error vs. Time Plot.



Figure 3b. Range Error vs. Time Coordinates.

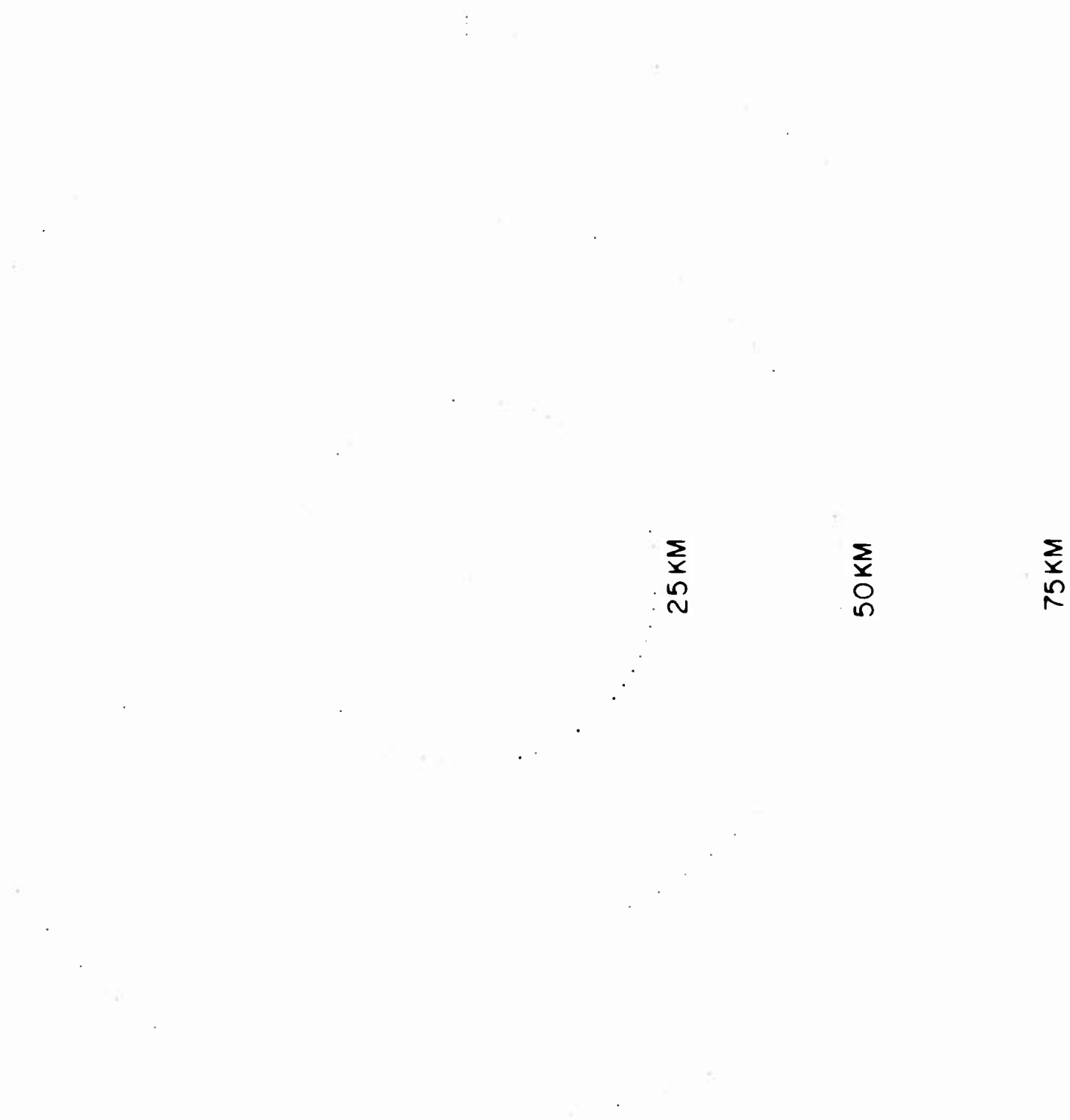


Figure 4. Range Plot Coordinates - Range Circles.

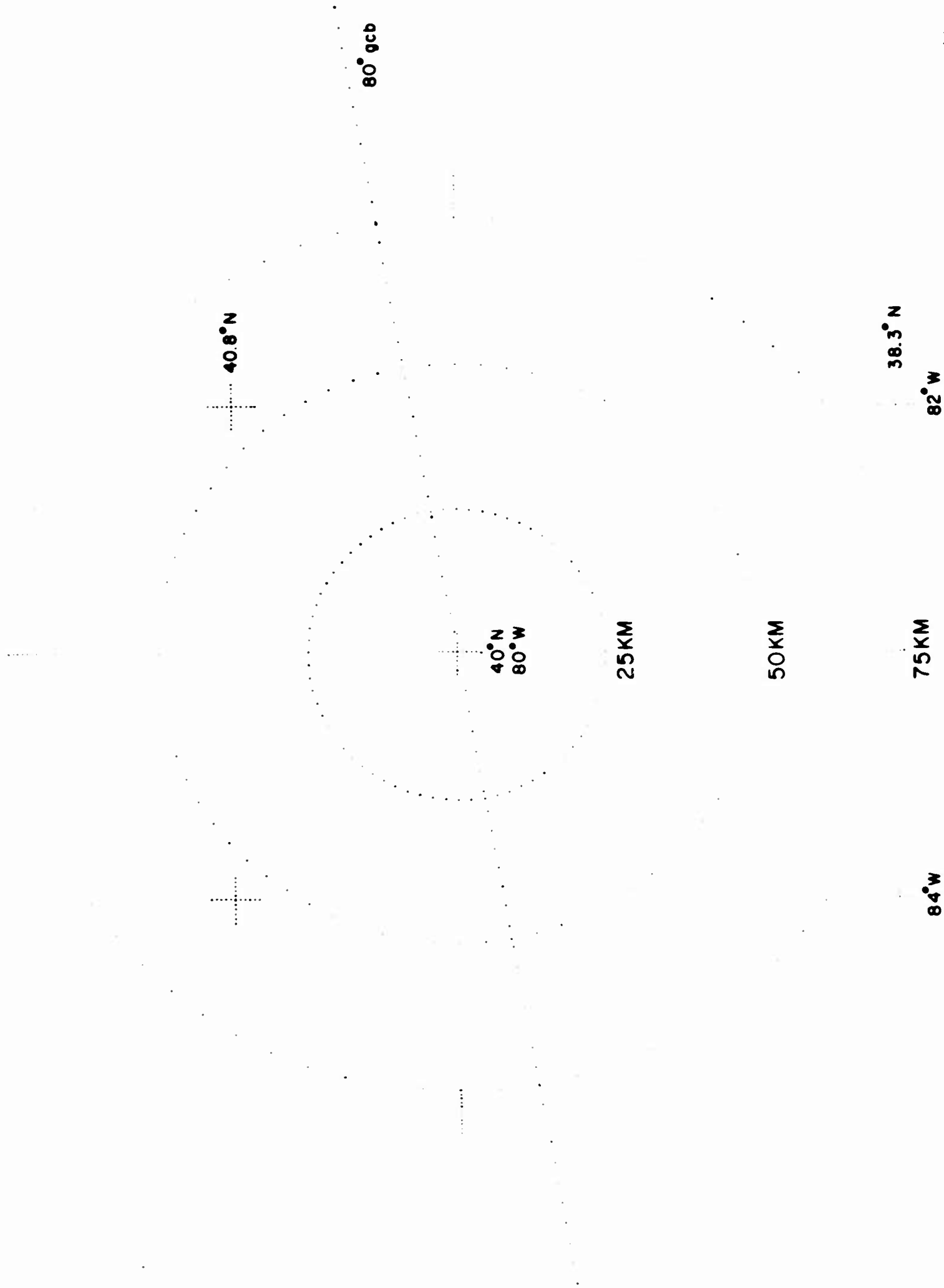


Figure 5. Coordinate Points and Great Circle Bearing Line Marker for Target Plot.

qcb

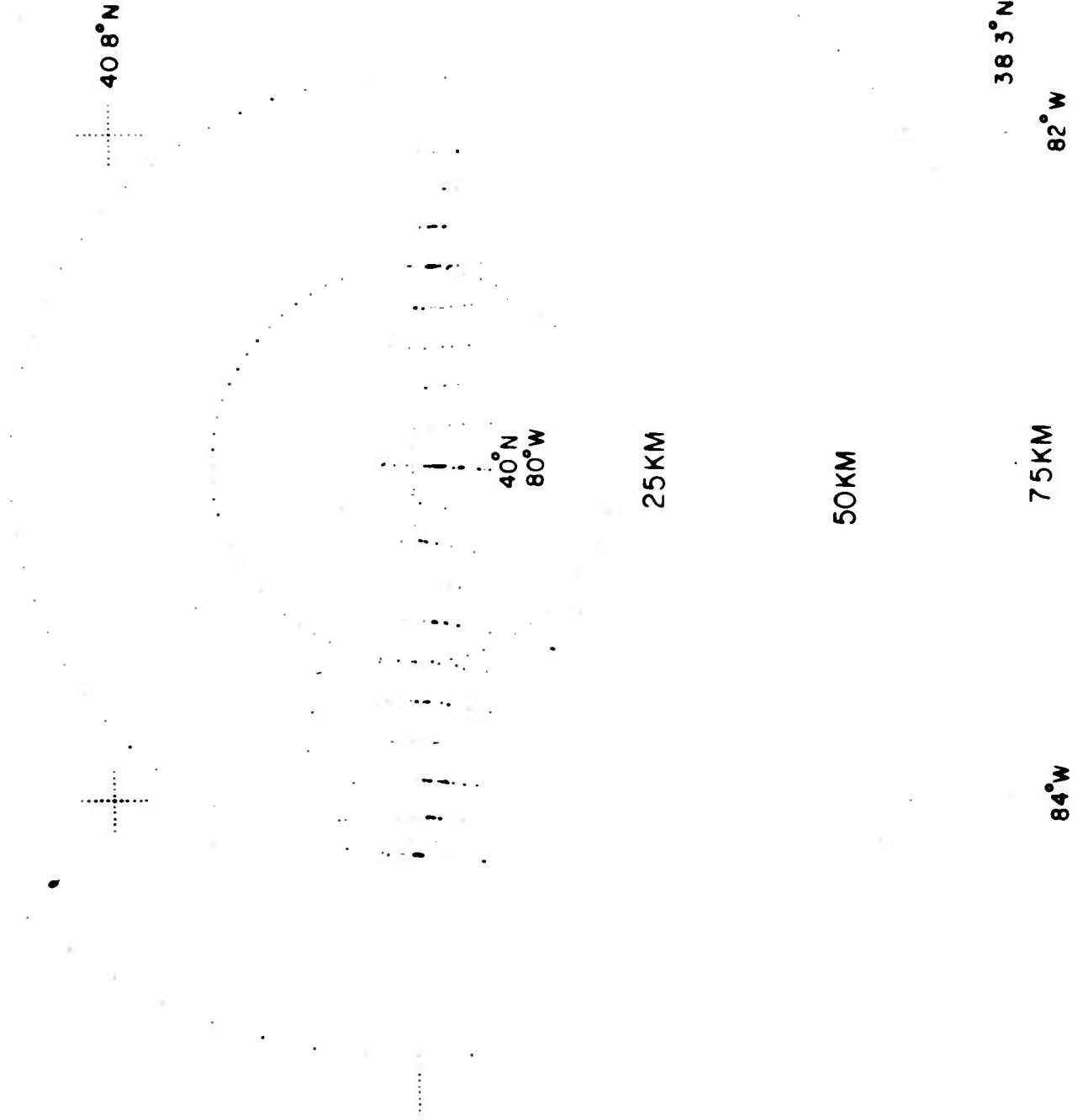
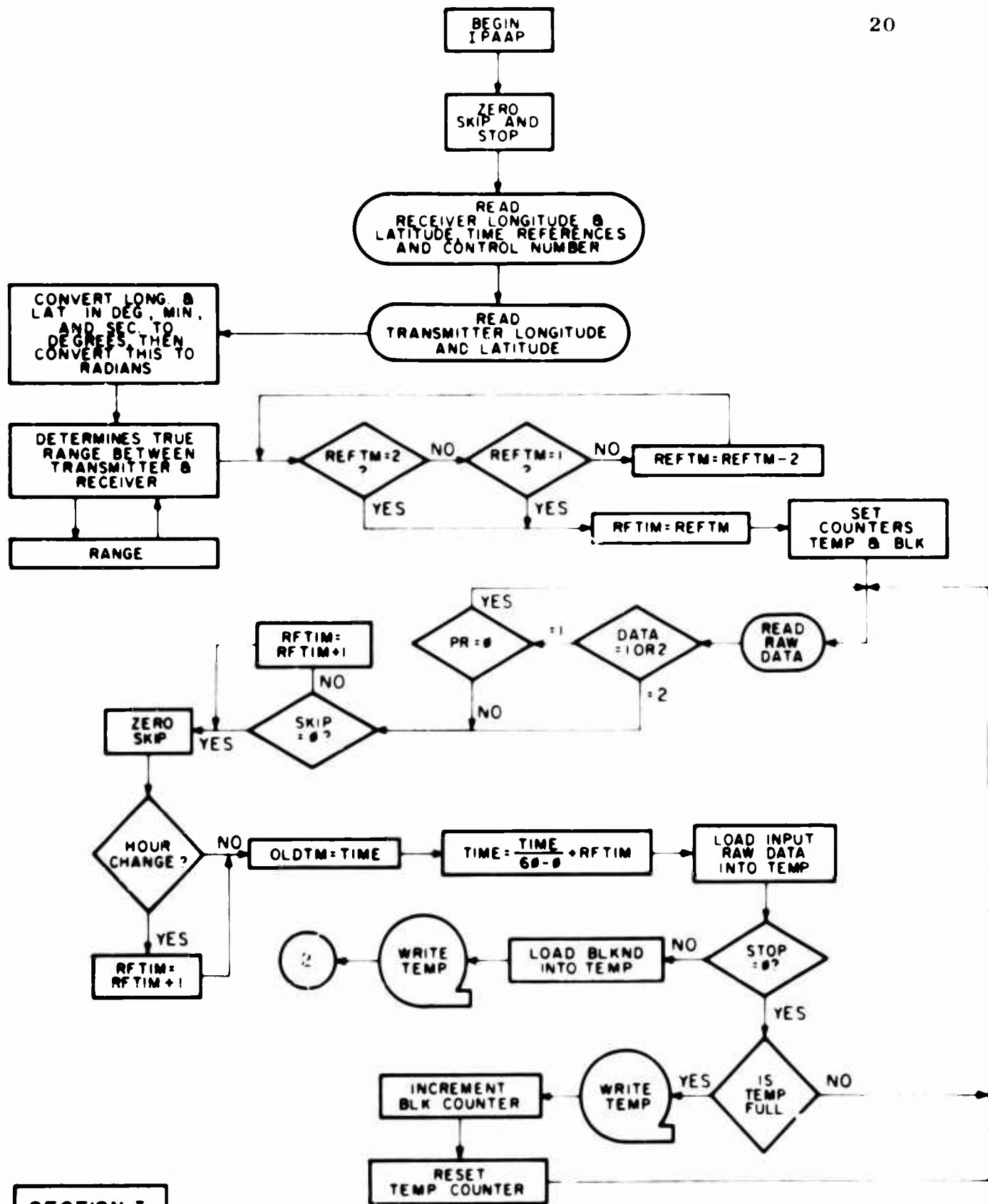
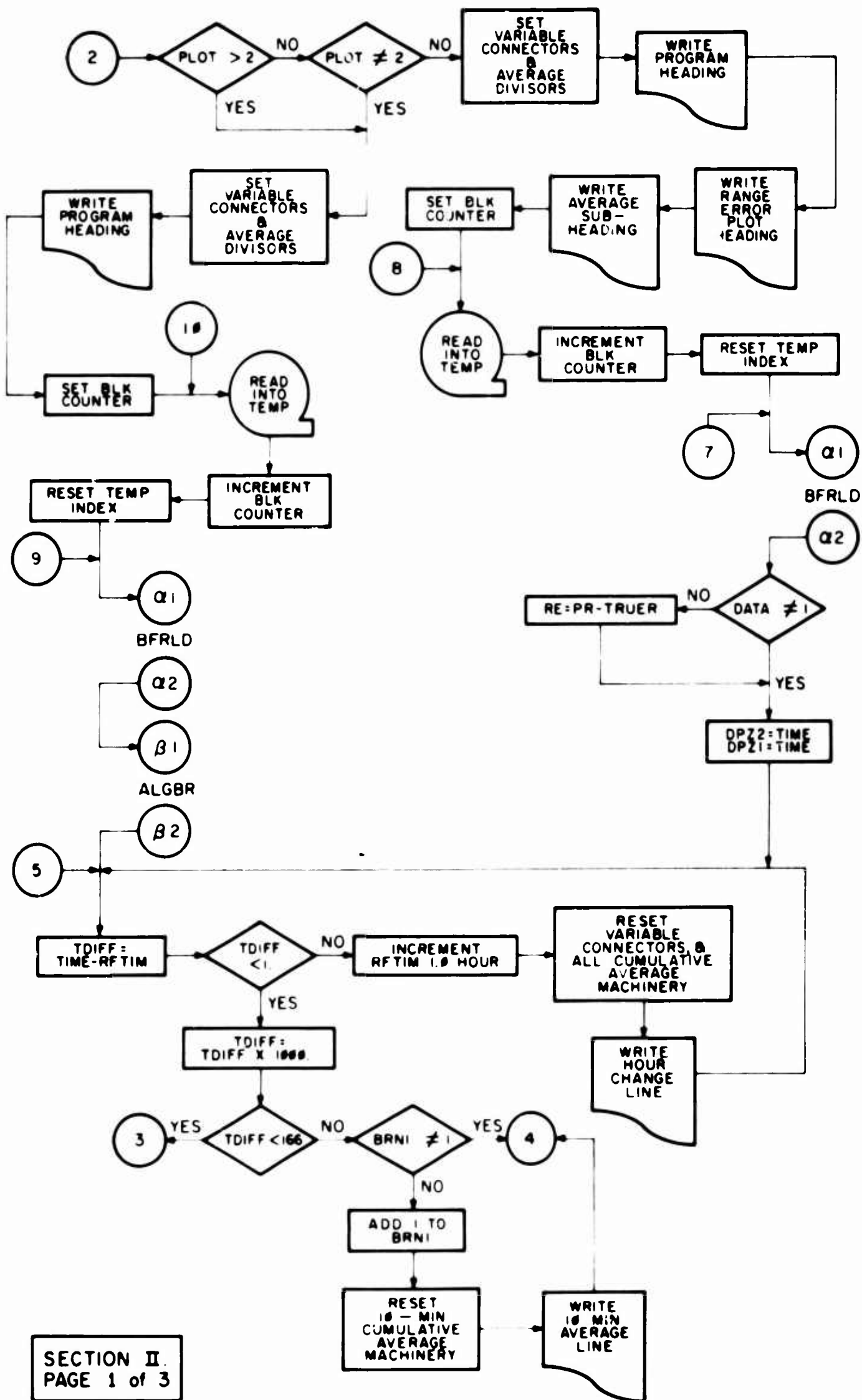
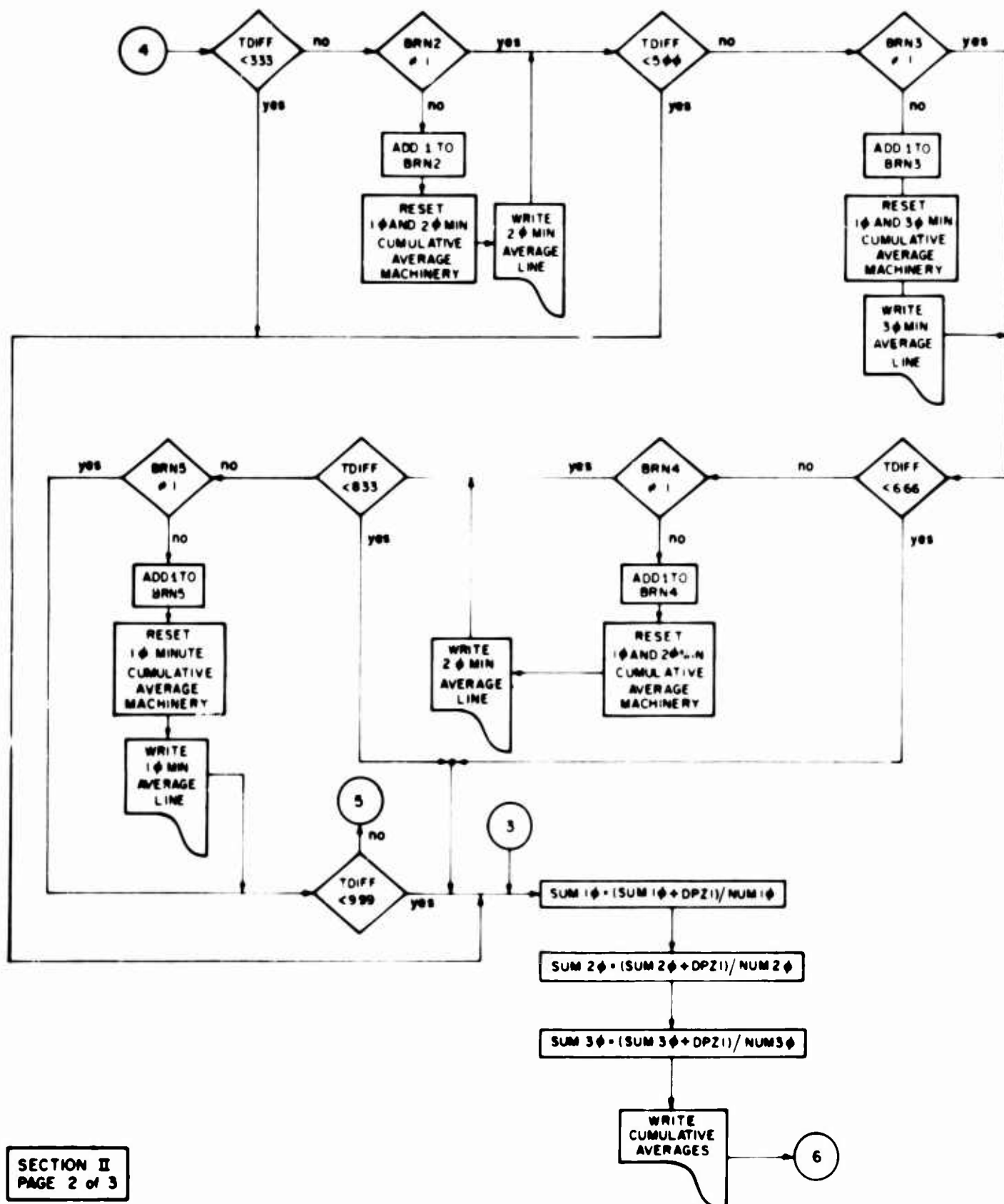
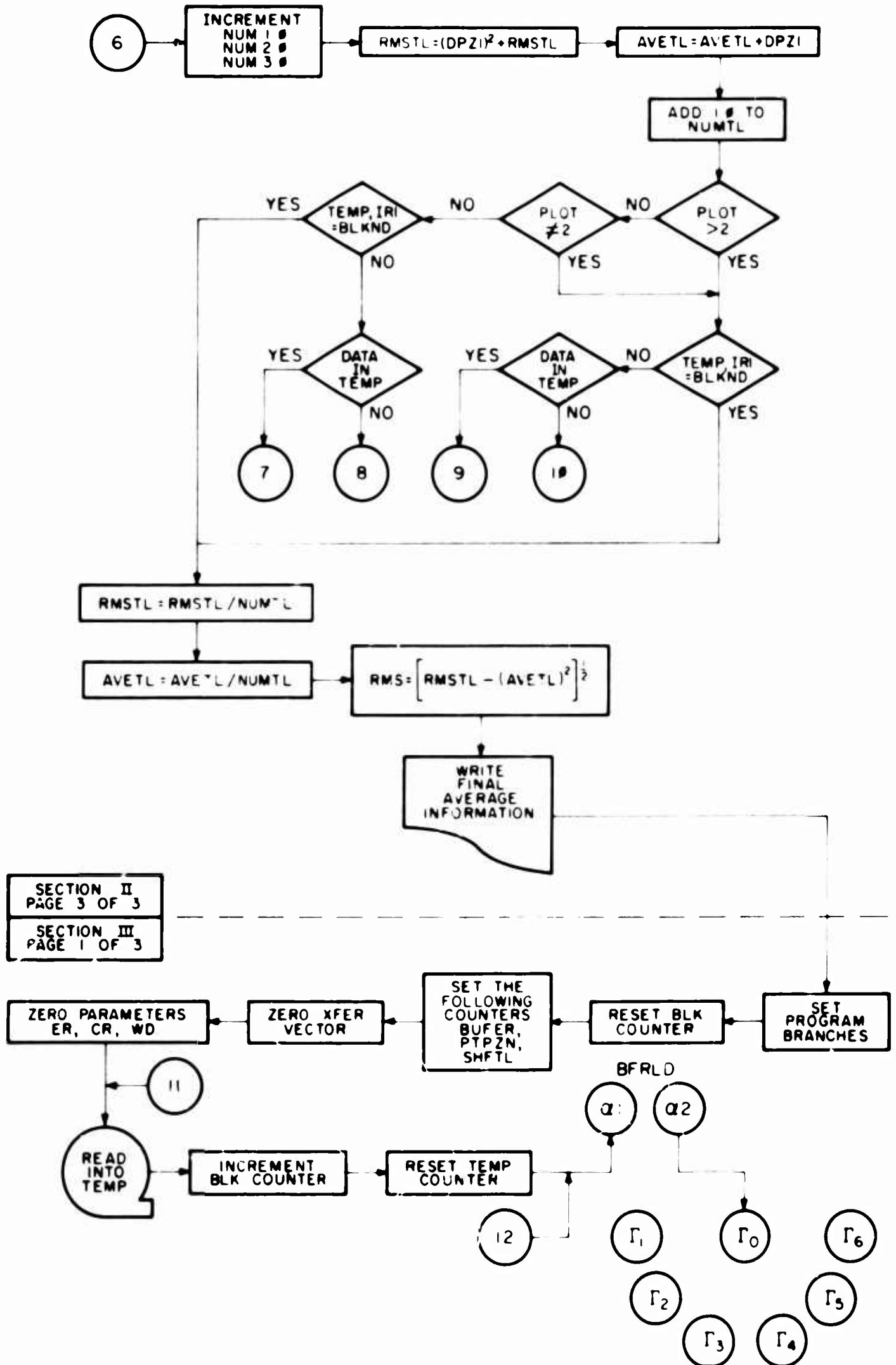


Figure 6. Target Plot (Complete).









Since Γ_2 , Γ_3 , Γ_4 , and Γ_5 are similar to Γ_1 , they have not been drawn.

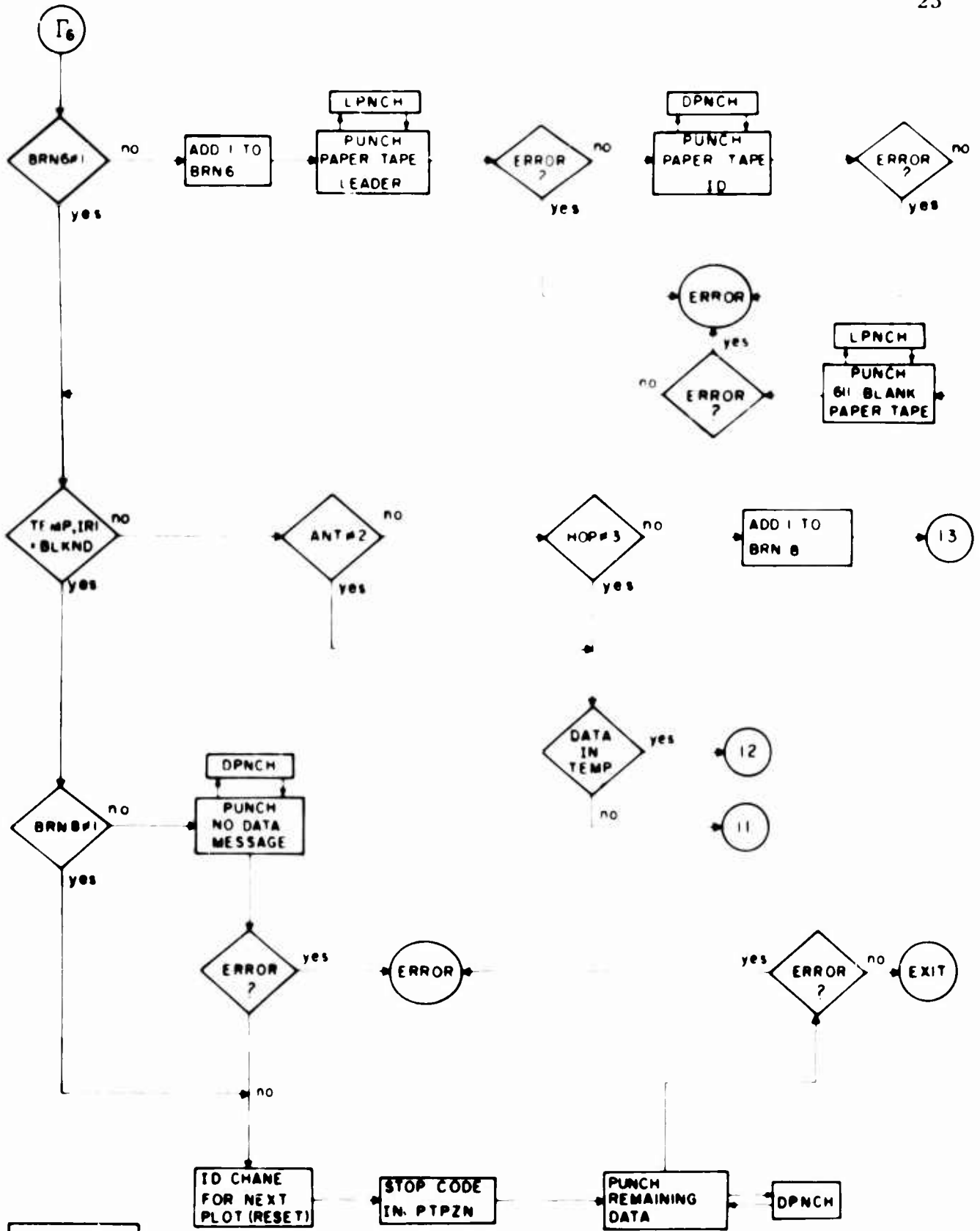
Changes are as follows for

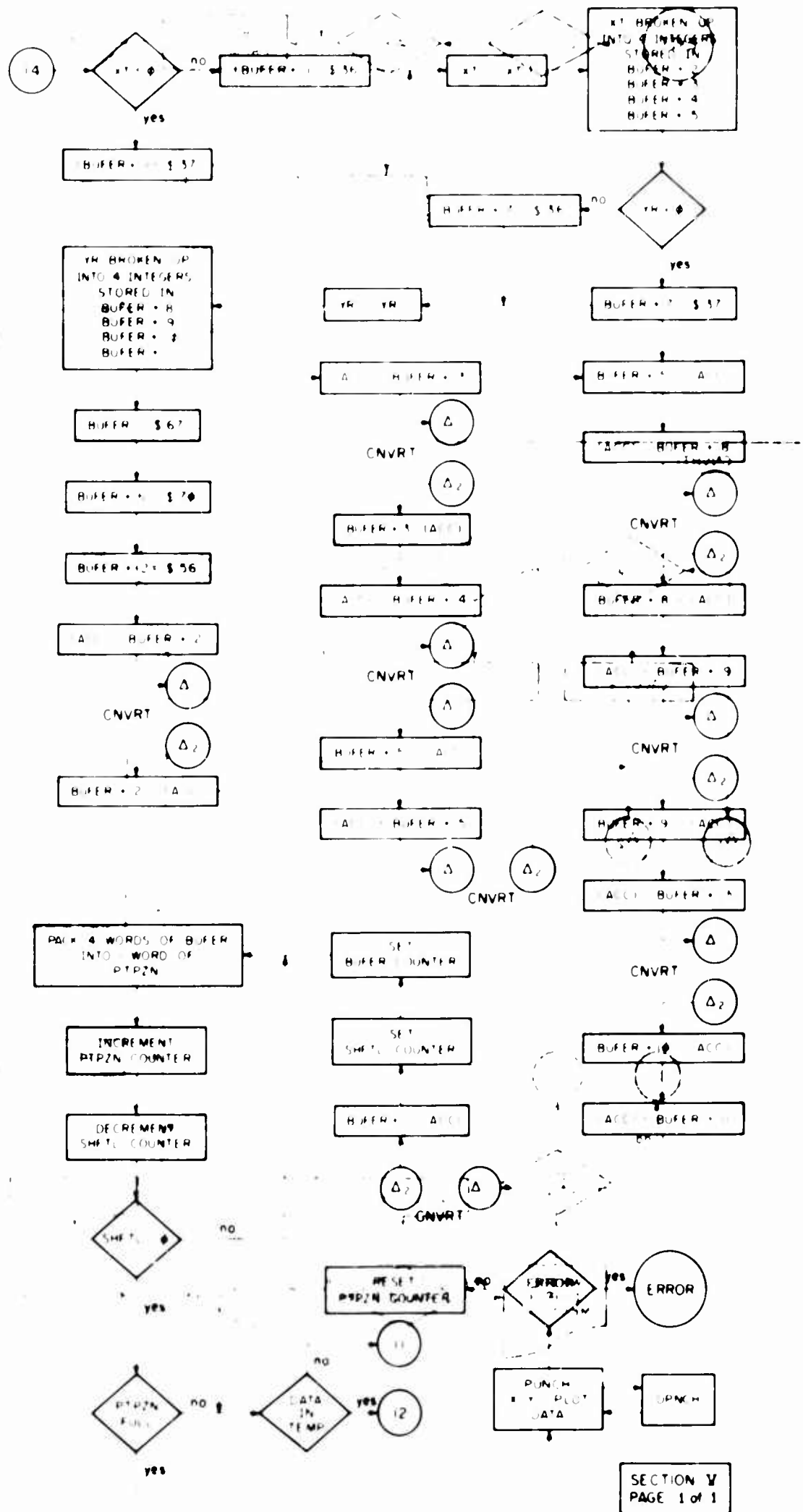
Γ_2 : BRN1 becomes BRN2, $\text{ANT} \neq 1$ remains $\text{ANT} \neq 1$, and $\text{HOP} \neq 1$ becomes
HOP 2.

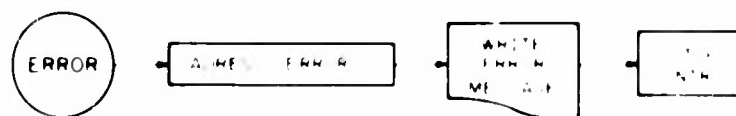
Γ_3 : BRN1 becomes BRN3, $\text{ANT} \neq 1$ remains $\text{ANT} \neq 1$, and $\text{HOP} \neq 1$ becomes
HOP 3.

Γ_4 : BRN1 becomes BRN4, $\text{ANT} \neq 1$ becomes $\text{ANT} \neq 2$, and $\text{HOP} \neq 1$ remains
HOP 1.

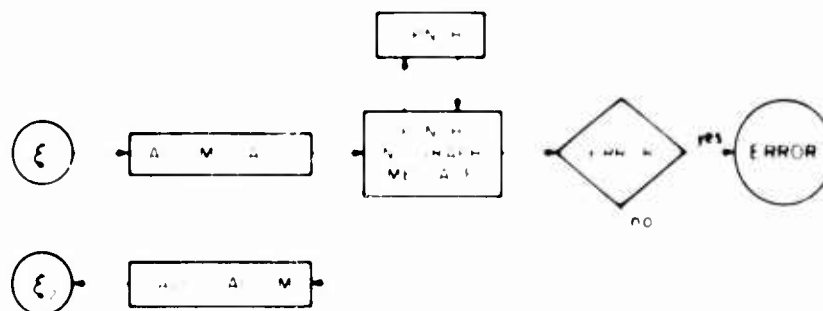
Γ_5 : BRN1 becomes BRN5, $\text{ANT} \neq 1$ becomes $\text{ANT} \neq 2$, and $\text{HOP} \neq 1$ becomes
HOP 2.



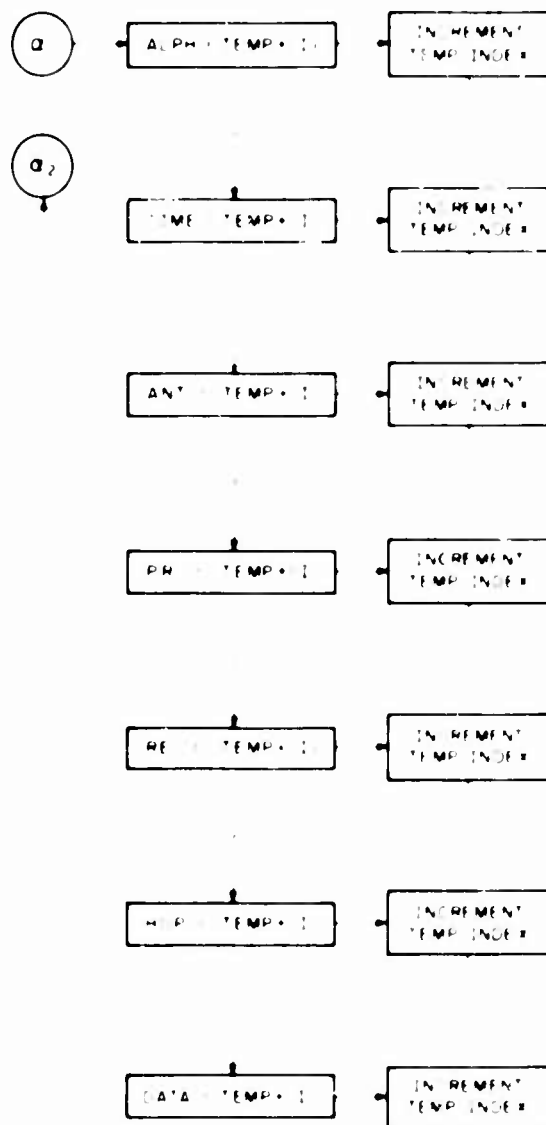


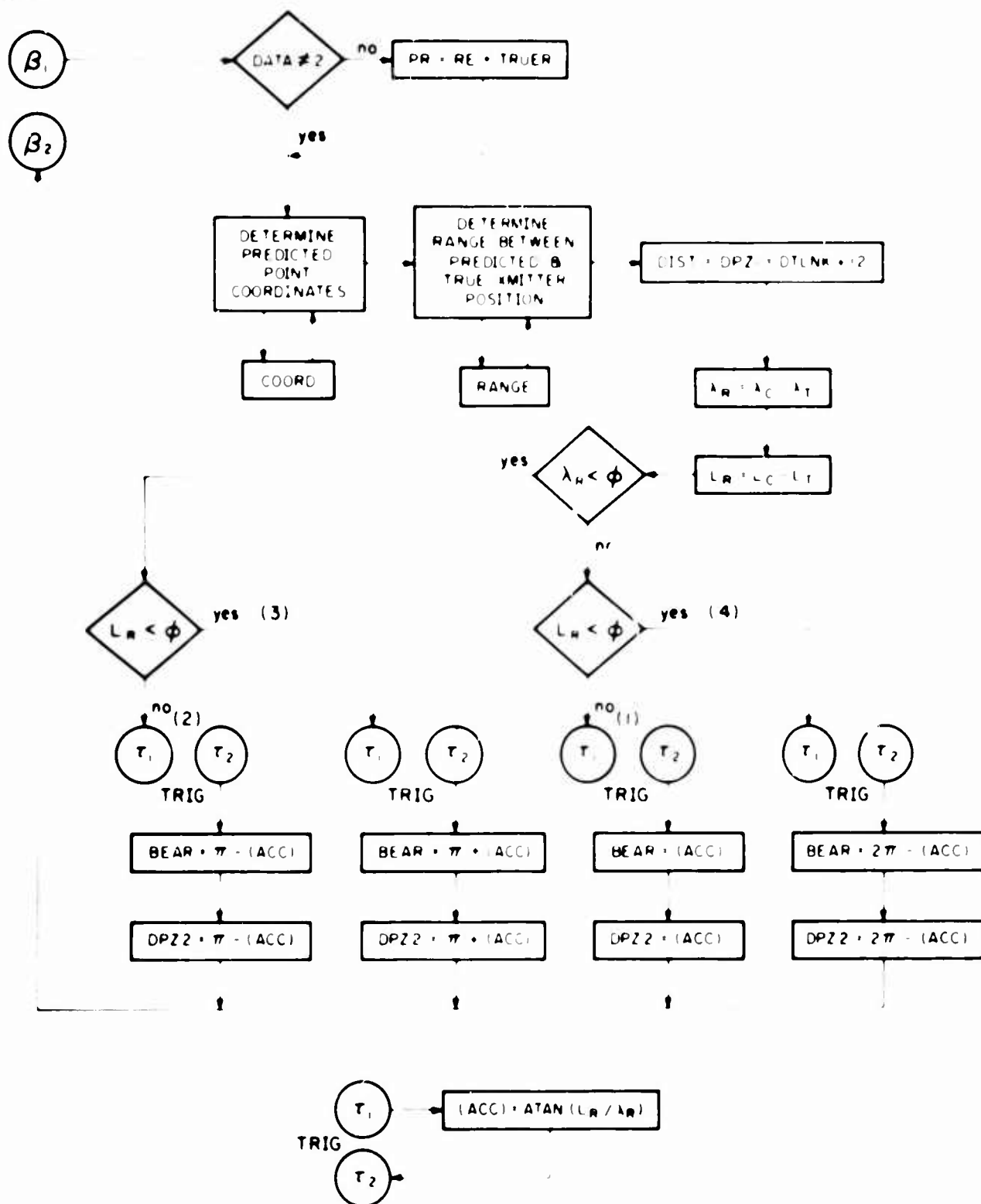


CNT 49



BFWLD





where

λ_R = LONGITUDE, RELATIVE
 λ_C = LONGITUDE, COMPUTED (PIA)
 λ_T = LONGITUDE, TRANSMITTER
 L_R = LATITUDE, RELATIVE
 L_C = LATITUDE, COMPUTED (PIA)
 L_T = LATITUDE, TRANSMITTER

BEGIN IPAPPS
 PRINT EQUIP LNPIH3
 CAMUR EQUIP CHEAD3
 RTAPE EQUIP MAG3
 MES TEMP(250),STDP,SKIP,LNGM1(2),LNGM2(2),LNGR3(2),

MAV A 10
 MAV A 20
 MAV A 30
 MAV A 40
 MAV A 50

014 00001
 014 00401
 014 00402
 014 00403
 014 00405
 014 00407
 014 00411
 014 00413
 014 00415
 014 00417
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 014 00470
 014 00471
 014 00472
 014 00473
 014 00474
 014 00475

LATM1(2),LATM2(2),LATM3(2),MEFIM,OLUTM,PLOT,ALPM,TIME, MAV A 60

ANI,PR,ME,POP,DATA,LNGT1(2),LNGT2(2),LNGT3(2),LATI1(2), MAV A 70

LATI2(2),LATI3(2),MT1M,HLK,RMSTL,AVEIL,NUM(L,AUPES, MAV A 80

NUM10,NUM20,NUM30,HRP1,HRP2,HRN3,HRN4,HRN5,HRN6,HRN7, MAV A 90

4

HRN8,DPZ1,DPZ2,IR,UIS1,ICS1,ICS2,ICS3,SUM10,SUM20, MAV A 100

[illegible]

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 1770000010
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 0000000377
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DATA AND PERFORMS CERTAIN CONVERSIONS	DIV	050.01	050.02	050.03	050.04	050.05	050.06	050.07	050.08	050.09	050.10	050.11	050.12	050.13	050.14	050.15	050.16	050.17	050.18	050.19	050.20	050.21	050.22	050.23	050.24	050.25	050.26	050.27	050.28	050.29	050.30	050.31	050.32	050.33	050.34	050.35	050.36	050.37	050.38	050.39	050.40	050.41	050.42	050.43	050.44	050.45	050.46	050.47	050.48	050.49	050.50	050.51	050.52	050.53	050.54	050.55	050.56	050.57	050.58	050.59	050.60	050.61	050.62	050.63	050.64	050.65	050.66	050.67	050.68	050.69	050.70	050.71	050.72	050.73	050.74	050.75	050.76	050.77	050.78	050.79	050.80	050.81	050.82	050.83	050.84	050.85	050.86	050.87	050.88	050.89	050.90	050.91	050.92	050.93	050.94	050.95	050.96	050.97	050.98	050.99	050.100	050.101	050.102	050.103	050.104	050.105	050.106	050.107	050.108	050.109	050.110	050.111	050.112	050.113	050.114	050.115	050.116	050.117	050.118	050.119	050.120	050.121	050.122	050.123	050.124	050.125	050.126	050.127	050.128	050.129	050.130	050.131	050.132	050.133	050.134	050.135	050.136	050.137	050.138	050.139	050.140	050.141	050.142	050.143	050.144	050.145	050.146	050.147	050.148	050.149	050.150	050.151	050.152	050.153	050.154	050.155	050.156	050.157	050.158	050.159	050.160	050.161	050.162	050.163	050.164	050.165	050.166	050.167	050.168	050.169	050.170	050.171	050.172	050.173	050.174	050.175	050.176	050.177	050.178	050.179	050.180	050.181	050.182	050.183	050.184	050.185	050.186	050.187	050.188	050.189	050.190	050.191	050.192	050.193	050.194	050.195	050.196	050.197	050.198	050.199	050.200	050.201	050.202	050.203	050.204	050.205	050.206	050.207	050.208	050.209	050.210	050.211	050.212	050.213	050.214	050.215	050.216	050.217	050.218	050.219	050.220	050.221	050.222	050.223	050.224	050.225	050.226	050.227	050.228	050.229	050.230	050.231	050.232	050.233	050.234	050.235	050.236	050.237	050.238	050.239	050.240	050.241	050.242	050.243	050.244	050.245	050.246	050.247	050.248	050.249	050.250	050.251	050.252	050.253	050.254	050.255	050.256	050.257	050.258	050.259	050.260	050.261	050.262	050.263	050.264	050.265	050.266	050.267	050.268	050.269	050.270	050.271	050.272	050.273	050.274	050.275	050.276	050.277	050.278	050.279	050.280	050.281	050.282	050.283	050.284	050.285	050.286	050.287	050.288	050.289	050.290	050.291	050.292	050.293	050.294	050.295	050.296	050.297	050.298	050.299	050.300	050.301	050.302	050.303	050.304	050.305	050.306	050.307	050.308	050.309	050.310	050.311	050.312	050.313	050.314	050.315	050.316	050.317	050.318	050.319	050.320
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[illegible]

TRA	CNT43	EXII INITIAL PHASE OF PROGRAM	MAV	
CLA 2IR13			MAV	A 1040
FLC 02523		IS TEMP FULL	MAV	A 1050
IMA CNT123		NO - READ NEXT DATA CARD	MAV	A 1060
WRITEU MAG,TEMP,255,HLK13		YES - WRITE TEMP ON MAG TAPE	MAV	A 1070
			MAV	A 1080
CLA HLK13				
ADD 013		INCREMENT MAG TAPE BLOCK NUMBER	MAV	A 1090
ST1 HLK13			MAV	A 1100
LXP 0041H13		RESET TEMP COUNTER	MAV	A 1120
TRA CNT123			MAV	A 1140
CNT4 ST7 SUM103			MAV	A 1140
ST7 SUM203			MAV	A 1141
ST7 SUM303			MAV	A 1142
ST7 AVE103			MAV	A 1143
ST7 AVE203			MAV	A 1144
ST7 AVE303			MAV	A 1145
CLA 023			MAV	A 1150
PL013			MAV	A 1160
IMA CNT133		TARGET PLOT TRANSFER	MAV	A 1170
PL013			MAV	A 1180
IMA CNT133		TARGET PLOT TRANSFER	MAV	A 1190
ST7 AVE113		SET THE INDICATED	MAV	A 1200
CLA 01.03		COUNTERS, ZERO THE INDICATED	MAV	A 1210
ST5 SUM113		LOCATIONS, AND ESTABLISH THE	MAV	A 1220
ST5 KFT113		PROPER VARIABLE CONNECTORS	MAV	A 1230
ST5 SUM113		SHOWN FOR INITIAL ENTRY	MAV	A 1240
ST5 SUM1203		IN THIS SECTION	MAV	A 1250
ST5 SUM303			MAV	A 1260
ST1 HKN13			MAV	A 1270
ST1 HKN23			MAV	A 1280
ST1 HKN33			MAV	A 1290
ST1 HKN43			MAV	A 1300
ST1 HKN53			MAV	A 1310
WRITE LPL1M,LNFM13			MAV	A 1320
WRITE LNP1M,LNFM13			MAV	A 1322
WRITE LNP1M,LNFM13		PRINT READING	MAV	A 1330

```

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013 00267 0 004 1 00 00133 000 000
013 00270 0 004 0 00 00001 000 005
013 00271 0 004 0 00 00000 000 000
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013 00273 0 004 0 00 00000 000 000
013 00274 0 004 0 00 00012 000 000
013 00275 0 004 1 00 00446 000 014
013 00276 0 004 1 00 00133 000 000
013 00277 0 004 0 12 00003 000 005
013 00300 0 004 0 00 00001 000 014
013 00301 1 004 0 00 00377 000 000
013 00302 0 004 0 00 00000 000 014
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013 00304 0 004 0 00 00001 000 014
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013 00352 1 004 1 00 00133 000 000
013 00353 0 004 0 00 00001 000 005
013 00354 0 004 0 00 02766 000 013
013 00355 0 004 0 00 03661 000 013

```

WRITE LNPTM,,LNFMG; PRINT SUBHEADING

MAV A 1940

CLA 0103

SET MAG TAPE BLOCK NUMBER
HEAD ONE BLOCK INTO TEMP

MAV A 1950

MAV A 1960
MAV A 1970

UNT6 HLKMD0MAG,TEMP,255,PLK3

CLA 0103

INCREMENT MAG TAPE BLOCK NUMBER

MAV A 1980

PAV A 1990

STI 0103

TEMP COUNTER

MAV A 2000

MAV A 2010

TEMP 0103

TEMP BUFFER LOADER

MAV A 2020

CLA 0103

IS PR ON ME GIVEN

MAV A 2030

MAV A 2040

TRA 0103

ME IS GIVEN

MAV A 2050

CLA 0103

PR IS GIVEN THEREFORE

MAV A 2060

SUM 0103

COMPUTE ME

MAV A 2070

STI 0103

TEMP COUNTER

MAV A 2080

CLA 0103

TEMP BUFFER LOADER

MAV A 2090

TRA 0103

IS PR ON ME GIVEN

MAV A 2100

CLA 0103

ME IS GIVEN

MAV A 2110

SUM 0103

COMPUTE ME

MAV A 2120

STI 0103

TEMP COUNTER

MAV A 2130

CLA 0103

TEMP BUFFER LOADER

MAV A 2140

TRA 0103

IS PR ON ME GIVEN

MAV A 2150

CLA 0103

ME IS GIVEN

MAV A 2160

SUM 0103

COMPUTE ME

MAV A 2170

STI 0103

TEMP COUNTER

MAV A 2180

CLA 0103

TEMP BUFFER LOADER

MAV A 2190

TRA 0103

IS PR ON ME GIVEN

MAV A 2200

CLA 0103

ME IS GIVEN

MAV A 2210

SUM 0103

COMPUTE ME

MAV A 2220

STI 0103

TEMP COUNTER

MAV A 2230

CLA 0103

TEMP BUFFER LOADER

MAV A 2240

TRA 0103

IS PR ON ME GIVEN

MAV A 2250

CLA 0103

ME IS GIVEN

MAV A 2260

SUM 0103

COMPUTE ME

MAV A 2263

WRITE LNPTM,,LNFMG;

MAV A 2262

WRITE LNPTM,,LNFMG; PRINT HEADLINE

MAV A 2270

U13 00356 0 004 0 00 00000 000 000	WRITE LNPTH, LNFMH1	PRINT SUBHEADING	NAV A 2280
U13 00357 0 004 1 00 00133 000 000			
U13 00360 0 004 0 00 00001 000 005			
U13 00361 0 004 0 00 00000 000 000			
U13 00362 0 004 0 00 03461 000 013			
U13 00363 0 004 0 00 00000 000 000			
U13 00364 0 004 0 00 00012 000 000	CLA 0103		NAV A 2290
U13 00365 0 004 0 00 00446 000 014	STI 0103	SET MAG TAPE BLOCK NUMBER	NAV A 2300
U13 00366 0 004 1 00 00133 000 000	UNT11 0103	HEAD ONE BLOCK INTO TEMP	NAV A 2310
U13 00367 0 004 0 12 00003 000 005			
U13 00370 0 004 0 00 00001 000 014			
U13 00371 1 004 0 00 00377 000 000			
U13 00372 0 004 0 00 00000 000 014			
U13 00373 0 004 2 00 00446 000 014			
U13 00374 0 004 0 00 00001 000 000	CLA 0103	INCREMENT MAG TAPE BLOCK NUMBER	NAV A 2320
U13 00375 0 004 0 00 00446 000 014	ADD 0103		NAV A 2330
U13 00376 0 004 0 00 00000 001 000	STI 0103	TEMP COUNTER	NAV A 2340
U13 00377 0 004 0 00 02525 000 013	LXP 0103	TEMP BUFFER LOADER	NAV A 2350
U13 00400 0 004 2 00 00430 000 014	UNT12 0103		NAV A 2360
U13 00401 0 004 0 00 02554 000 013	CLA 0103	ALGEBRAIC COMPUTATIONS	NAV A 2370
U13 00402 0 004 2 00 00423 000 014	TRM 0103		NAV A 2380
U13 00403 0 004 2 00 00445 000 014	CLA 0103	INCREMENT MAG TAPE BLOCK NUMBER	NAV A 2390
U13 00404 0 004 0 00 00571 000 014	STI 0103		NAV A 2400
U13 00405 0 004 0 00 00001 000 000	STI 0103	IS TIME DIFFERENTIAL < ONE HOUR	NAV A 2410
U13 00406 0 004 0 00 00437 000 013	THA 0103	YES - CONTINUE	NAV A 2420
U13 00407 0 004 2 00 00445 000 014	UNT14 0103	NO - INCREMENT TIME	NAV A 2430
U13 00410 0 004 0 00 00001 000 000	CLA 0103	REFERENCE TO NEXT HOUR	NAV A 2440
U13 00411 0 004 0 00 00445 000 014	ADD 0103		NAV A 2450
U13 00412 0 004 0 00 00001 000 000	STI 0103	RESET THE FOLLOWING	NAV A 2460
U13 00413 0 004 0 00 00456 000 014	CLA 0103	VARIABLE CONNECTIONS	NAV A 2470
U13 00414 0 004 0 00 00457 000 014	STI 0103		NAV A 2480
U13 00415 0 004 0 00 00460 000 014	STI 0103		NAV A 2490
U13 00416 0 004 0 00 00461 000 014	STI 0103		NAV A 2500
U13 00417 0 004 0 00 00462 000 014	STI 0103		NAV A 2510
U13 00420 0 004 0 00 00453 000 014	STI 0103	RESET RUNNING AVERAGE MACHINERY	NAV A 2520
U13 00421 0 004 0 00 00454 000 014	STI 0103		NAV A 2530
U13 00422 0 004 0 00 00455 000 014	STI 0103		NAV A 2540
U13 00423 0 004 0 00 00475 000 014	STI 0103		NAV A 2550
U13 00424 0 004 0 00 00476 000 014	STI 0103		NAV A 2560
U13 00425 0 004 0 00 00477 000 014	STI 0103		NAV A 2570
U13 00426 0 004 0 00 00500 000 014	STI 0103		NAV A 2580
U13 00427 0 004 0 00 00501 000 014	STI 0103		NAV A 2590
U13 00430 0 004 0 00 00502 000 014	STI 0103	PRINT DOUBLE LINE - HOUR CHANGE	NAV A 2600
U13 00431 0 004 1 00 00133 000 000	UNT15 0103		NAV A 2610
U13 00432 0 004 0 00 00002 000 005	CLA 0103		NAV A 2620
U13 00433 0 004 0 00 00000 000 000	STI 0103		
U13 00434 0 004 0 00 03761 000 013	STI 0103		
U13 00435 0 004 0 00 00000 000 000	STI 0103		
U13 00436 0 004 0 00 00402 000 013	STI 0103		
U13 00437 0 004 2 00 00571 000 014	STI 0103	TRY AGAIN	NAV A 2630
U13 00438 0 004 0 00 00750 000 000	STI 0103	TIME DIFFERENTIAL = SUM	NAV A 2640
U13 00441 0 004 0 00 00571 000 014	STI 0103	NUMBER 1 SUCH THAT JOKES1000	NAV A 2650
U13 00442 0 004 0 00 00246 000 000	STI 0103		NAV A 2660
U13 00443 0 004 0 00 00603 000 013	STI 0103	IS TIME < FIRST 10 MINUTES	NAV A 2670
U13 00444 0 004 2 00 00456 000 014	STI 0103	YES - GO TO RUNNING AVERAGES	NAV A 2680
U13 00445 0 004 0 00 00001 000 000	STI 0103	NO - TEST BRANCH	NAV A 2690
		IS THIS THE FIRST TIME THROUGH	NAV A 2700

NO - CONTINUE AT THE NEXT TEST	YES - CHANGE BRANCH	NO - CONTINUE AT THE NEXT TEST	YES - CHANGE BRANCH
RESET FIRST 10 MINUTE	RESET FIRST 10 MINUTE	RESET FIRST 10 MINUTE	RESET FIRST 10 MINUTE
RUNNING AVERAGE MACHINERY	RUNNING AVERAGE MACHINERY	RUNNING AVERAGE MACHINERY	RUNNING AVERAGE MACHINERY
PRINT 10 MINUTE DOTTED LINE	PRINT 10 MINUTE DOTTED LINE	PRINT 10 MINUTE DOTTED LINE	PRINT 10 MINUTE DOTTED LINE

IS TIME < FIRST 20 MINUTES	NAV	A	2790
YES - GO TO RUNNING AVERAGES	NAV	A	2800
NO - TEST BRANCH	NAV	A	2810
IS THIS THE FIRST TIME THROUGH	NAV	A	2820
NO - CONTINUE AT THE NEXT TEST	NAV	A	2830
YES - CHANGE BRANCH	NAV	A	2840
RESET SECOND 10 MINUTE	NAV	A	2850
RUNNING AVERAGE MACHINERY	NAV	A	2860
AND RESET FIRST 20 MINUTE	NAV	A	2870
RUNNING AVERAGE MACHINERY	NAV	A	2880
	NAV	A	2890
	NAV	A	2900
	NAV	A	2910
	NAV	A	2920
	NAV	A	2930
PRINT 20 MINUTE DOTTED LINE	NAV	A	2940

IS TIME < FIRST 30 MINUTES	YAV	A	2950
YES - GO TO RUNNING AVERAGES	YAV	A	2960
NO - TEST BRANCH	YAV	A	2970
IS THIS THE FIRST TIME THROUGH	YAV	A	2980
NO - CONTINUE AT NEXT TEST	YAV	A	2990
YES - CHANGE BRANCH	YAV	A	3000
RESET THIRD 10 MINUTE	YAV	A	3010
RUNNING AVERAGE MACHINERY	YAV	A	3020
AND RESET FIRST 30 MINUTE	YAV	A	3030
RUNNING AVERAGE MACHINERY	YAV	A	3040
	YAV	A	3050
	YAV	A	3060
	YAV	A	3070
	YAV	A	3080
	YAV	A	3090
PRINT 30 MINUTE DOTTED LINE	YAV	A	3100

IS TIME < FIRST 40 MINUTES	RAV A	3110
YES - GO TO RUNNING AVERAGES	RAV A	3120
NO - TEST BRANCH	RAV A	3130
	RAV A	3140

IS THIS THE FIRST TIME THROUGH	PAY	A	3150
NO - CONTINUE AT NEXT TEST	PAY	A	3160
YES - CHANGE BRANCH	PAY	A	3170
	PAY	A	3180
RESET FOURTH 10 MINUTE	PAY	A	3190
RUNNING AVERAGE MACHINERY	PAY	A	3200
AND RESET SECOND 20 MINUTE	PAY	A	3210
RUNNING AVERAGE MACHINERY	PAY	A	3220
	PAY	A	3230
	PAY	A	3240
	PAY	A	3250
PRINT 40 MINUTE DOTTED LINE	PAY	A	3260

PRINT 40 MINUTE DOTTED LINE

IS TIME < FIRST 50 MINUTES	RAY	A	3270
YES - GO TO RUNNING AVERAGES	RAY <td>A <td>3280</td> </td>	A <td>3280</td>	3280
NO - TEST BRANCH	RAY <td>A <td>3290</td> </td>	A <td>3290</td>	3290
IS THIS THE FIRST TIME THROUGH	RAY <td>A <td>3300</td> </td>	A <td>3300</td>	3300
NO - CONTINUE AT NEXT TEST	RAY <td>A <td>3310</td> </td>	A <td>3310</td>	3310
YES - CHANGE BRANCH	RAY <td>A <td>3320</td> </td>	A <td>3320</td>	3320
	RAY <td>A <td>3330</td> </td>	A <td>3330</td>	3330
	RAY <td>A <td>3340</td> </td>	A <td>3340</td>	3340
RESET FIFTH 10 MINUTE	RAY <td>A <td>3350</td> </td>	A <td>3350</td>	3350
RUNNING AVERAGE MACHINERY	RAY <td>A <td>3360</td> </td>	A <td>3360</td>	3360
	RAY <td>A <td>3370</td> </td>	A <td>3370</td>	3370
	RAY <td>A <td>3380</td> </td>	A <td>3380</td>	3380
PRINT 50 MINUTE DOTTED LINE	RAY <td>A <td>3390</td> </td>	A <td>3390</td>	3390

PRINT 50 MINUTE DOTTED LINE

IS TIME < FIRST 40 MINUTES	HAV A 3400
YES - GO TO HUNNING AVERAGES	HAV A 3410
NO - RESET EVERYTHING START NEXT	HAV A 3420
HUNNING AVERAGES EMPTY	HAV A 3430
	HAV A 3440

50 MINUTE RUNNING AVERAGE

20 MINUTE RUNNING AVERAGE

30 MINUTE RUNNING AVERAGE PRINT RESULTS

PRINT RESULTS

```

FWD - WLF
TWA CN11M3
ADD 013
STI HAN43
STZ SUM103
STZ SUM203
STZ AVE103
STZ AVE203
CLA U1.03
STS NUM103
STS NUM203
WRITE LNPTM...LNFMN3

```

WRITE LENGTH, LENGTH

CNT10	CLA	TDIFF3
FLO	OR333	
TWA	CNT1203	
CLA	WRN53	
FUO	UI3	
TWA	CNT1203	
ADU	UI3	
STI	WRN53	
STZ	SUM203	
STZ	AVE103	
CLA	UI.03	
STS	NUM103	
WRIE	LNPTW.	

STATION 11

CNT19 CLA YUIFF8
FLO 09998
TRA CNT208
TRA CNT148
CNT20 CLA SUM108

REF ID: A66585

013	00530	0	FUL	0	00	00001	000	040
013	00537	0	TMA	0	00	00556	000	013
013	00540	0	ADU	0	00	00001	000	000
013	00541	0	STI	0	00	00461	000	014
013	00542	0	STI	0	00	00475	000	014
013	00543	0	STI	0	00	00476	000	014
013	00544	0	STI	0	00	00500	000	014
013	00545	0	STI	0	00	00501	000	014
013	00546	0	CLA	0	00	00001	000	000
013	00547	0	SIS	0	00	00453	000	014
013	00550	0	STI	0	00	00454	000	014
013	00551	0	TMA	3	00	00133	000	000
013	00552	0	NCA	0	00	00001	000	005
013	00553	0	NCA	0	00	00000	000	000
013	00554	0	NCA	0	00	04075	000	013
013	00555	0	NCA	0	00	00000	000	000
013	00556	0	CLA	2	00	00271	000	014
013	00557	0	FLO	0	00	01501	000	000
013	00560	0	TMA	0	00	00603	000	013
013	00561	0	CLA	2	00	00462	000	014
013	00562	0	FUL	0	00	00001	000	000
013	00563	0	TMA	0	00	00577	000	013
013	00564	0	ADU	0	00	00001	000	000
013	00565	0	STI	0	00	00462	000	014
013	00566	0	STI	0	00	00475	000	014
013	00567	0	STI	0	00	00500	000	014
013	00570	0	CLA	0	00	00001	000	000
013	00571	0	STI	0	00	00453	000	014
013	00572	0	TMA	1	00	00133	000	000
013	00573	0	NCA	0	00	00001	000	005
013	00574	0	NCA	0	00	00000	000	000
013	00575	0	NCA	0	00	04062	000	013
013	00576	0	NCA	0	00	00000	000	000
013	00577	0	CLA	2	00	00271	000	014
013	00600	0	FLO	0	00	01747	000	000
013	00601	0	TMA	0	00	00603	000	013
013	00602	0	TMA	3	00	00407	000	013
013	00603	0	CLA	2	00	00475	000	014
013	00604	0	ADU	2	00	00466	000	014
013	00605	0	STI	0	00	00475	000	014
013	00606	0	STI	2	00	00453	000	014
013	00607	0	STI	0	00	00500	000	014
013	00610	0	CLA	2	00	00476	000	014
013	00611	0	ADU	2	00	00466	000	014
013	00612	0	SIS	0	00	00476	000	014
013	00613	0	NIV	2	00	00454	000	014
013	00614	0	STI	0	00	00501	000	014
013	00615	0	CLA	2	00	00477	000	014
013	00616	0	ADU	2	00	00466	000	014
013	00617	0	STI	0	00	00477	000	014
013	00620	0	NIV	2	00	00455	000	014
013	00621	0	STI	0	00	00502	000	014
013	00622	0	TMA	1	00	00133	000	000
013	00623	0	NCA	0	00	00001	000	005
013	00624	0	CLA	0	00	00021	000	013
013	00625	0	NCA	0	00	04163	0	

013 00626 0 001 0 00 00000 000 014
 013 00627 0 001 0 00 00453 000 014
 013 00630 0 001 0 00 00001 000 014
 013 00631 0 001 0 00 00453 000 014
 013 00632 0 001 0 00 00454 000 014
 013 00633 0 001 0 00 00001 000 014
 013 00634 0 001 0 00 00454 000 014
 013 00635 0 001 0 00 00455 000 014
 013 00636 0 001 0 00 00001 000 014
 013 00637 0 001 0 00 00455 000 014
 013 00640 0 001 0 00 00456 000 014
 013 00641 0 001 0 00 00456 000 014
 013 00642 0 001 0 00 00457 000 014
 013 00643 0 001 0 00 00457 000 014
 013 00644 0 001 0 00 00456 000 014
 013 00645 0 001 0 00 00450 000 014
 013 00646 0 001 0 00 00450 000 014
 013 00647 0 001 0 00 00451 000 014
 013 00650 0 001 0 00 00001 000 014
 013 00651 0 001 0 00 00451 000 014
 013 00652 0 001 0 00 00002 000 014
 013 00653 0 001 0 00 00421 000 014
 013 00654 0 001 0 00 00607 000 013
 013 00655 0 001 0 00 00421 000 014
 013 00656 0 001 0 00 00607 000 013
 013 00657 0 001 0 00 00001 001 014
 013 00658 0 001 0 00 00001 000 014
 013 00659 0 001 0 00 00001 000 014
 013 00660 0 001 0 00 00001 000 014
 013 00661 0 001 0 00 00603 000 013
 013 00662 0 001 0 00 00607 000 013
 013 00663 0 001 0 00 00001 000 014
 013 00664 0 001 0 00 00374 000 013
 013 00665 0 001 0 00 00307 000 013
 013 00666 0 001 0 00 00276 000 013
 013 00667 0 001 0 00 00001 001 014
 013 00670 0 001 0 00 00001 000 013
 013 00671 0 001 0 00 00603 000 013
 013 00672 0 001 0 00 00607 000 013
 013 00673 0 001 0 00 00001 000 014
 013 00674 0 001 0 00 00374 000 013
 013 00675 0 001 0 00 00377 000 013
 013 00676 0 001 0 00 00366 000 013
 013 00677 0 001 0 00 00447 000 014
 013 00700 0 001 0 00 00421 000 014
 013 00701 0 001 0 00 00347 000 014
 013 00702 0 001 0 00 00450 000 014
 013 00703 0 001 0 00 00451 000 014
 013 00704 0 001 0 00 00450 000 014
 013 00705 0 001 0 00 00450 000 014
 013 00706 0 001 0 00 00450 000 014
 013 00707 0 001 0 00 00627 000 014
 013 00710 0 001 0 00 00447 000 014
 013 00711 0 001 0 00 00627 000 014
 013 00712 0 001 0 00 00627 000 014
 013 00713 0 001 0 00 00611 000 014
 013 00714 0 001 0 00 00627 000 014
 013 00715 0 001 0 00 00630 000 014

UNIT 1

UNIT 2

UNIT 3

UNIT 4

UNIT 5

UNIT 6

UNIT 7

INTERMEDIATE RMS RESULTS

INTERMEDIATE TOTAL AVERAGE RESULTS

TARGET PLUT TRANSFER

TARGET PLUT TRANSFER

WANGS ENRUP ENTRY

TEST FOR END OF RAW DATA

THERE IS MORE RAW DATA

END OF RAW DATA TRANSFER POINT

IS THERE DATA IN TEMP

YES - LOAD DATA BUFFER

NO - HEAD IN NEW BLOCK

TARGET PLUT ENTRY

TEST FOR END OF RAW DATA

THERE IS MORE RAW DATA

END OF RAW DATA TRANSFER POINT

IS THERE DATA IN TEMP

YES - LOAD DATA BUFFER

NO - HEAD IN A NEW BLOCK

FINAL COMPUTATIONS

TO DETERMINE THE

TOTAL AVERAGE

AND THE

TOTAL RMS AVERAGE

WHITE LNPTW,LNLSO,LNFMB PRINT FINAL RUNNING AVERAGE RESULTS MAY A 4100

013	00/16	0	YEM	1	0	06153	000	000
013	00/17	0	CCA	0	0	00001	000	005
013	00/20	0	CCA	0	00	03044	000	013
013	00/21	0	CCA	0	00	04203	000	013
013	00/22	0	CCA	0	00	00000	000	000

013	00/23	0	01	0	0001	00	00
013	00/24	0	01	0	00450	00	014
013	00/25	0	01	0	00457	00	014
013	00/26	0	01	0	00460	00	014
013	00/27	0	01	0	00461	00	014
013	00/30	0	01	0	00462	00	014
013	00/28	0	01	0	00464	00	014

013	00/31	0	511	0	00	00463	000	014
013	00/32	0	511	0	00	00464	000	014
013	00/33	0	511	0	00	00465	000	014
013	00/34	0	514	0	00	00012	000	000
013	00/35	0	511	0	00	00446	000	014
013	00/36	0	184	0	01	00000	001	000
013	00/37	0	184	0	02	00000	001	000

013	00/40	0	14	00000	001	000
013	00/41	0	14	00004	001	000
013	00/42	0	14	00000	001	000
013	00/43	0	17	00574	000	014
013	00/44	0	17	00575	000	014
013	00/45	0	17	00572	000	014
013	00/46	0	14	00133	000	000

013	00/75	0	004	0	12	00003	000	004
013	00/75	0	004	0	00	00001	000	014
013	00/75	1	004	0	00	00377	000	014
013	00/75	0	000	0000000445	000	014		
013	00/75	0	004	2	00	00446	000	014
013	00/75	1	000	0	00	00001	000	000
013	00/75	0	011	0	00	00446	000	014

SET THE FOLLOWING
VARIABLE CONNECTORS

4170	A	4170
4180	A	4180
4190	A	4190
4200	A	4200
4210	A	4210

RESET MAG TAPE BLOCK NUMBER
TEMP COUNTER
BUFFER COUNTER
STPM COUNTER
SHFTL COUNTER
TRANSFER VECTOR
ERROR PARAMETER

REAR BLICK OF MAG TAPE

UNIT 22 НІККУОЧАВ, TEMP, 255, HIKI

INJUNCTION REAFFIRMED

TEMP COUNTER
TEMP BUFFER LOADER

-120 1HE SCAN BRANCH
 -120 2HE SCAN BRANCH
 -120 1HE SCAN BRANCH
 -240 1HE SCAN BRANCH
 -240 2HE SCAN BRANCH
 -240 1HE SCAN BRANCH
 -120 1HE SCAN ENJMY

UNCLAS

1122 41444
MOMMA 3N11: (04444 414) 1571

100
 100
 100
 100

013	01003	6	F04	2	00	00574	000	014
013	01002	0	T00	0	10	02672	000	013
013	01005	0	CL0	0	00	00120	000	000
013	01004	0	S71	0	00	00575	000	014


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013 01075 0 01 0 00 00572 000 014
013 01076 0 01 0 00 00015 000 014
013 01077 0 01 0 00 00503 000 014
013 01101 0 01 0 00 00572 000 014
013 01102 0 01 0 00 00574 000 014
013 01103 0 01 0 00 02672 000 013
013 01104 0 01 0 00 00000 001 000
013 01105 0 01 0 00 00572 000 014
013 01106 0 01 0 00 00746 000 013
013 01107 0 01 0 00 00457 000 014
013 01110 0 01 0 00 00001 000 000
013 01111 0 01 0 00 01142 000 013
013 01112 0 01 0 00 00001 000 000
013 01113 0 01 0 00 00457 000 014
013 01114 0 01 0 00 00204 000 000
013 01115 0 01 0 00 00573 000 014
013 01116 0 01 0 00 00013 000 014
013 01117 0 01 0 00 00573 000 014
013 01120 0 01 0 00 00574 000 014
013 01121 0 01 0 00 00574 000 014
013 01122 0 01 0 00 02672 000 013
013 01123 0 01 0 00 00120 000 000
013 01124 0 01 0 00 00573 000 014
013 01125 0 01 0 00 00013 000 014
013 01126 0 01 0 00 03074 000 013
013 01127 0 01 0 00 00573 000 014
013 01130 0 01 0 00 00574 000 014
013 01133 0 01 0 00 00574 000 014
013 01132 0 01 0 00 02672 000 013
013 01133 0 01 0 00 00074 000 000
013 01134 0 01 0 00 00573 000 014
013 01135 0 01 0 00 00013 000 014
013 01136 0 01 0 00 00573 000 014
013 01137 0 01 0 00 00574 000 014
013 01140 0 01 0 00 00574 000 014
013 01141 0 01 0 00 02672 000 013
013 01142 0 01 0 00 00001 001 014
013 01143 0 01 0 00 03074 000 013
013 01144 0 01 0 00 01146 000 013
013 01145 0 01 0 00 01164 000 013
013 01146 0 01 0 00 00424 000 014
013 01147 0 01 0 00 00001 000 000
013 01150 0 01 0 00 01160 000 013
013 01151 0 01 0 00 00427 000 014
013 01152 0 01 0 00 00002 000 000
013 01153 0 01 0 00 01160 000 013
013 01154 0 01 0 00 00463 000 014
013 01155 0 01 0 00 00001 000 000
013 01156 0 01 0 00 00463 000 014
013 01157 0 01 0 00 01757 000 013
013 01160 0 01 0 00 00001 000 011
013 01161 0 01 0 00 00374 000 000
013 01162 0 01 0 00 00757 000 013
013 01163 0 01 0 00 00744 000 013
013 01164 0 01 0 00 00463 000 014

```

ST1 001
 SUBMT DPVCH(PIP2N,CH,EN): PUNCH REMAINING DATA
 PAV A 5070
 PAV A 5100
 PAV A 5110
 PAV A 5120
 PAV A 5130
 PAV A 5140
 PAV A 5150
 PAV A 5160
 PAV A 5170
 PAV A 5180
 PAV A 5190
 PAV A 5200
 PAV A 5210

TEST FOR SUBROUTINE ERROR
 ERROR EXIT
 RESET PIP2N COUNTER
 PAV A 5090
 PAV A 5100
 PAV A 5110
 PAV A 5120
 PAV A 5130
 PAV A 5140
 PAV A 5150
 PAV A 5160
 PAV A 5170
 PAV A 5180
 PAV A 5190
 PAV A 5200
 PAV A 5210

P-120 ZM-SCAN ENTRY
 FIRST TIME THROUGH
 NO
 YES - CHANGE BRANCH
 PAV A 5090
 PAV A 5100
 PAV A 5110
 PAV A 5120
 PAV A 5130
 PAV A 5140
 PAV A 5150
 PAV A 5160
 PAV A 5170
 PAV A 5180
 PAV A 5190
 PAV A 5200
 PAV A 5210

PUNCH LEADER
 PAV A 5090
 PAV A 5100
 PAV A 5110
 PAV A 5120
 PAV A 5130
 PAV A 5140
 PAV A 5150
 PAV A 5160
 PAV A 5170
 PAV A 5180
 PAV A 5190
 PAV A 5200
 PAV A 5210

TEST FOR SUBROUTINE ERROR
 ERROR EXIT
 PAV A 5220
 PAV A 5230
 PAV A 5240
 PAV A 5250
 PAV A 5260

SUBMT DPVCH(PIP2N,CH,EN): PUNCH PAPER TAPE REWINDING
 PAV A 5220
 PAV A 5230
 PAV A 5240
 PAV A 5250
 PAV A 5260

TEST FOR SUBROUTINE ERROR
 ERROR EXIT
 PAV A 5270
 PAV A 5280
 PAV A 5290
 PAV A 5300
 PAV A 5310

TEST FOR SUBROUTINE ERROR
 ERROR EXIT
 TEST FOR END OF RAW DATA
 IS THERE RAW DATA LEFT
 DATA TO BE ANALYZED
 END OF P-120 TWO-MOP & DATA
 PAV A 5320
 PAV A 5330
 PAV A 5340
 PAV A 5350
 PAV A 5360
 PAV A 5370
 PAV A 5380
 PAV A 5390
 PAV A 5400
 PAV A 5410
 PAV A 5420
 PAV A 5430
 PAV A 5440
 PAV A 5450
 PAV A 5460
 PAV A 5470
 PAV A 5480
 PAV A 5490
 PAV A 5500
 PAV A 5510
 PAV A 5520

IS DATA P-120 TYPE
 NO
 YES - PROCEED
 IS DATA TWO-MOP & TYPE
 NO
 YES - PROCEED AND SET
 VARIABLE CONNECTION
 DATA AVAILABLE
 IS THERE DATA IN TAMP
 YES - LOAD DATA BUFFER
 NO - HEAD IN NEW BLOCK
 PAV A 5520
 PAV A 5530
 PAV A 5540
 PAV A 5550
 PAV A 5560
 PAV A 5570
 PAV A 5580
 PAV A 5590
 PAV A 5600
 PAV A 5610
 PAV A 5620
 PAV A 5630
 PAV A 5640
 PAV A 5650
 PAV A 5660
 PAV A 5670
 PAV A 5680
 PAV A 5690
 PAV A 5700
 PAV A 5710
 PAV A 5720

NAV A 5530
NAV A 5540
NAV A 5550
NAV A 5560
NAV A 5570

NO 0-120 ZME DATA

NO DATA MESSAGE

UNIT 134
TAP 0134
LXP 0134
STP 0134
SUMPT 0134(MESG2,CH,EM):

TEST FOR SUBROUTINE ERROR

ERROR EXIT

SET NEXT SCAN BRANCH

UNIT 134
TAP 0134
LXP 0134
STP 0134
SUMPT 0134(MESG2,CH,EM):

HEADLINE CHANGE FROM

0-120 ZME TO 0-120 IMF

RESET IMPSE TWO
VARIABLE CONNECTIONS

RESET MAG TAPE BLOCK NUMBER
STOP CODE FOR X-Y PLOTTER

PUNCH REMAINING DATA

TEST FOR SUBROUTINE ERROR

ERROR EXIT

RESET PTPZN COUNTER

0-120 IMF SCAN ENTRY

FIRST LINE THROUGH

YES - CHANGE MESSAGE

PUNCH LEADER

TEST FOR SUBROUTINE ERROR

ERROR EXIT

PUNCH MAGNET TAPE MESSAGE

013 01167 0 00 0 00 00002 000 000
013 01168 0 00 0 00 01177 000 013
013 01169 0 00 0 00 00210 000 000
013 01170 0 00 0 00 00573 000 014
013 01171 0 00 0 00 00015 000 004
013 01172 0 00 0 00 03120 000 013
013 01173 0 00 0 00 00573 000 014
013 01174 0 00 0 00 00574 000 014
013 01175 0 00 0 00 00574 000 014
013 01176 0 00 0 00 02672 000 013
013 01177 0 00 0 00 00001 001 000
013 01200 0 00 0 00 03164 000 013
013 01201 0 00 0 00 03115 000 013
013 01202 0 00 0 00 03155 000 013
013 01203 0 00 0 00 03106 000 013
013 01204 0 00 0 00 03146 000 013
013 01205 0 00 0 00 03110 000 013
013 01206 0 00 0 00 03167 000 013
013 01207 0 00 0 00 03211 000 013
013 01210 0 00 0 00 00001 000 000
013 01211 0 00 0 00 00444 000 014
013 01212 0 00 0 00 00465 000 014
013 01213 0 00 0 00 00012 000 000
013 01214 0 00 0 00 00446 000 014
013 01215 0 00 0 00 03072 000 013
013 01216 0 00 0 00 03503 001 014
013 01217 0 00 0 00 00572 000 014
013 01220 0 00 0 00 00004 000 000
013 01221 0 00 0 00 00572 000 014
013 01222 0 00 0 00 00015 000 004
013 01223 0 00 0 00 00573 000 014
013 01224 0 00 0 00 00572 000 014
013 01225 0 00 0 00 00574 000 014
013 01226 0 00 0 00 00574 000 014
013 01227 0 00 0 00 02672 000 013
013 01230 0 00 0 00 00000 001 000
013 01231 0 00 0 00 00572 000 014
013 01232 0 00 0 00 00746 000 013
013 01233 0 00 0 00 00460 000 014
013 01234 0 00 0 00 00001 000 000
013 01235 0 00 0 00 01266 000 013
013 01236 0 00 0 00 00001 000 000
013 01237 0 00 0 00 00460 000 014
013 01238 0 00 0 00 01264 000 000
013 01239 0 00 0 00 00573 000 014
013 01240 0 00 0 00 00015 000 004
013 01241 0 00 0 00 00573 000 013
013 01242 0 00 0 00 00573 000 014
013 01243 0 00 0 00 00573 000 014
013 01244 0 00 0 00 00574 000 014
013 01245 0 00 0 00 00574 000 014
013 01246 0 00 0 00 02672 000 013
013 01247 0 00 0 00 00120 000 000
013 01248 0 00 0 00 00573 000 014
013 01249 0 00 0 00 00015 000 004
013 01250 0 00 0 00 00574 000 014
013 01251 0 00 0 00 00574 000 014
013 01252 0 00 0 00 00574 000 014
013 01253 0 00 0 00 00573 000 014
013 01254 0 00 0 00 00574 000 014

NAV A 5530
NAV A 5540
NAV A 5550
NAV A 5560
NAV A 5570

NAV A 5530
NAV A 5540
NAV A 5550
NAV A 5560
NAV A 5570

NAV A 5530
NAV A 5540
NAV A 5550
NAV A 5560
NAV A 5570

NAV A 5530
NAV A 5540
NAV A 5550
NAV A 5560
NAV A 5570

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013 01255 0 F0P 2 00 00574 000 014
013 01256 0 TMM 0 10 02672 000 013
013 01257 0 CLA 0 00 00074 000 000
013 01260 0 STL 0 00 00573 000 014
013 01261 0 TMM 1 00 00013 000 014
013 01262 0 CLA 0 00 00573 000 014
013 01263 0 CLA 0 00 00574 000 014
013 01264 0 F0P 2 00 00574 000 014
013 01265 0 TMM 0 10 02672 000 013
013 01266 0 CLA 0 01 00001 000 014
013 01267 0 TMM 2 00 03071 000 013
013 01270 0 TMM 0 10 01272 000 013
013 01271 0 TMM 0 00 01310 000 013
013 01272 0 CLA 2 00 00424 000 014
013 01273 0 F0P 0 00 00001 000 000
013 01274 0 TMM 0 10 01304 000 013
013 01275 0 CLA 2 00 00427 000 014
013 01276 0 F0P 0 00 00003 000 000
013 01277 0 TMM 0 00 01304 000 013
013 01300 0 CLA 2 00 00465 000 014
013 01301 0 F0P 0 00 00001 000 000
013 01302 0 STL 0 00 00465 000 014
013 01303 0 TMM 0 00 01757 000 013
013 01304 0 CLA 2 00 00001 000 001
013 01305 0 F0P 0 00 00574 000 000
013 01306 0 TMM 0 00 00757 000 013
013 01307 0 TMM 0 00 00746 000 013
013 01310 0 CLA 2 00 00465 000 014
013 01311 0 F0P 0 00 00001 000 000
013 01312 0 TMM 0 00 01323 000 013
013 01313 0 CLA 0 00 00210 000 000
013 01314 0 STL 0 00 00573 000 014
013 01315 0 TMM 1 00 00015 000 004
013 01316 0 CLA 0 00 03120 000 013
013 01317 0 CLA 0 00 00573 000 014
013 01320 0 CLA 0 00 00574 000 014
013 01321 0 F0P 2 00 00574 000 014
013 01322 0 TMM 0 00 02672 000 013
013 01323 0 ADP 0 05 00001 001 000
013 01324 0 CAL 2 00 03170 000 013
013 01325 0 STL 0 00 03073 000 013
013 01326 0 CAL 2 00 03171 000 013
013 01327 0 STL 0 00 03076 000 013
013 01330 0 CAL 2 00 03172 000 013
013 01331 0 STL 0 00 03077 000 013
013 01332 0 CAL 2 00 03173 000 013
013 01333 0 STL 0 00 03100 000 013
013 01334 0 CAL 2 00 03174 000 013
013 01335 0 STL 0 00 03105 000 013
013 01336 0 CAL 2 00 03175 000 013
013 01337 0 STL 0 00 03176 000 013
013 01338 0 CAL 2 00 03176 000 013
013 01339 0 STL 0 00 03170 000 013
013 01342 0 CAL 2 00 03177 000 013
013 01343 0 STL 0 00 03111 000 013
013 01344 0 CLA 0 00 00001 000 000

TEST FOR SUBROUTINE ERRORS
ERRORS EXIT
PUNCH LEADER

TEST FOR SUBROUTINE ERRORS
ERRORS EXIT
IS THERE DATA IN TEMP
YES - PROCEED
IS DATA ONE-MOP TYPE
NO
YES - PROCEED AND SET
VARIABLE CONNECTION
DATA AVAILABLE
IS THERE DATA IN TEMP
YES - LOAD DATA BUFFER
NO - READ IN NEW BLOCK
END U120 IMP DATA
END U120 IMP DATA
NO DATA MESSAGE

TEST FOR SUBROUTINE ERRORS
ERRORS EXIT
SET NEXT SCAN BRANCH

TESTING CHANGE FROM
U-120 IMP TO U-240 IMP

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[illegible]

POINT A LATITUDE	POINT A LONGITUDE	POINT A ELEVATION	POINT B LATITUDE	POINT B LONGITUDE	POINT B ELEVATION	POINT C LATITUDE	POINT C LONGITUDE	POINT C ELEVATION	POINT D LATITUDE	POINT D LONGITUDE	POINT D ELEVATION	POINT E LATITUDE	POINT E LONGITUDE	POINT E ELEVATION	POINT F LATITUDE	POINT F LONGITUDE	POINT F ELEVATION	POINT G LATITUDE	POINT G LONGITUDE	POINT G ELEVATION	POINT H LATITUDE	POINT H LONGITUDE	POINT H ELEVATION	POINT I LATITUDE	POINT I LONGITUDE	POINT I ELEVATION	POINT J LATITUDE	POINT J LONGITUDE	POINT J ELEVATION	POINT K LATITUDE	POINT K LONGITUDE	POINT K ELEVATION	POINT L LATITUDE	POINT L LONGITUDE	POINT L ELEVATION	POINT M LATITUDE	POINT M LONGITUDE	POINT M ELEVATION	POINT N LATITUDE	POINT N LONGITUDE	POINT N ELEVATION	POINT O LATITUDE	POINT O LONGITUDE	POINT O ELEVATION	POINT P LATITUDE	POINT P LONGITUDE	POINT P ELEVATION	POINT Q LATITUDE	POINT Q LONGITUDE	POINT Q ELEVATION	POINT R LATITUDE	POINT R LONGITUDE	POINT R ELEVATION	POINT S LATITUDE	POINT S LONGITUDE	POINT S ELEVATION	POINT T LATITUDE	POINT T LONGITUDE	POINT T ELEVATION	POINT U LATITUDE	POINT U LONGITUDE	POINT U ELEVATION	POINT V LATITUDE	POINT V LONGITUDE	POINT V ELEVATION	POINT W LATITUDE	POINT W LONGITUDE	POINT W ELEVATION	POINT X LATITUDE	POINT X LONGITUDE	POINT X ELEVATION	POINT Y LATITUDE	POINT Y LONGITUDE	POINT Y ELEVATION	POINT Z LATITUDE	POINT Z LONGITUDE	POINT Z ELEVATION																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
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013 03361 02411007016
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 013 03366 04010201000
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 013 03443 00000000000
 013 03444 00000000000

013 03361 02411007016

013 03361 0000010001

013 03362 01000000000

013 03363 00000000000

013 03364 00000000000

013 03365 02411211000

013 03366 04010201000

013 03367 04000000000

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013	03337	0561342/056
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013	03397	0561342/056
013	03398	0561342/056
013	03399	0561342/056
013	03400	0561342/056

..... / 12000 AVERAGE MAX 3200

TIME MINUTES AVERAGE TIME MAX 3300

..... / 12000 AVERAGE MAX 3310

..... / 12000 AVERAGE MAX 3320

013 04247 040A2621000
 013 04250 067000000000
 013 04251 041110000000
 013 04252 024000000016
 013 04253 023000000024
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 013 04256 067000000000
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 013 04320 017000000000

LNPM FORM 17M TRANSLATION ERRORS

NAV B 3650

LNPM FORM 11M END OF JOB

NAV B 3660

LNST (1ST ADDRESS) 1, 2, 3

NAV B 3670

LNPM FORM 14 102M PAPER TAPE PUNCH STATION ERROR / 25M ADDRESS UP NAV B 3680

LNPM FORM 18 105/21M ERROR CODE NUMBER 1, 121

NAV B 3690

LNPM FORM 17/18

NAV B 3701

Fig.

NAV B 3710

LNPM FORM 17/18

LNPM FORM 17/18

LNPM FORM 17/18

LNPM FORM 17/18

LNPM FORM 17/18

LNPM FORM 17/18

LNPM	002	00001	CHBAU	002	00006	MAG	005	00003	TEMP	014	00001	STOP	014	00401	SKIP	014	00402	LNCH1	014	00403
LNQ42	014	00404	LNCH3	014	00407	LATM1	014	00411	LATM2	014	00413	LATM3	014	00415	REFM	014	00417	OLUM	014	00420
PLOT	014	00421	ALPM	014	00422	TIME	014	00423	AM1	014	00424	PM	014	00425	RE	014	00426	MOP	014	00427
DATA	014	00430	LNQY1	014	00431	LNQY2	014	00432	LNQY3	014	00433	LATY1	014	00437	LATY2	014	00441	LATY3	014	00443
MFTM	014	00447	MRK	014	00448	RMSTL	014	00447	AVEL	014	00450	NUMTL	014	00451	ADRES	014	00452	NUM10	014	00453
NUM20	014	00454	NUM30	014	00455	HRN1	014	00456	HRN2	014	00457	HRN3	014	00460	HRN4	014	00461	HRN5	014	00462
HRN6	014	00463	HRN7	014	00464	HRN8	014	00465	HRN9	014	00466	UP22	014	00467	IM	014	00470	DISI	014	00471
IC51	014	00472	IC52	014	00473	IC53	014	00474	SUM10	014	00475	SUM20	014	00476	SUM30	014	00477	AVP10	014	00500
AVP20	014	00501	AVE30	014	00502	PTP2N	014	00503	SUMEM	014	00504	MEAN	014	00570	TDIFF	014	00571	WD	014	00572
CM	014	00573	EM	014	00574	VT	014	00575	FM	014	00576	X1	014	00577	VI	014	00578	ACCUM	014	00601
ABC	014	00602	ODUTH	014	00603	EVN14	014	00604	ODU14	014	00605	EVU14	014	00606	BUFFM	014	00607	DIFIL	014	00627
MAS	014	00630	ODUMY	002	00601	DTLNA	002	00602	PIE	013	03061	FMOP1	013	03063	MAD	013	03062	MUS	013	03067
FLKNO	013	03071	STPCU	013	03072	SHFIL	013	03073	MESG1	013	03074	MESG2	013	03120	MESG3	013	03162	MESG4	013	03164
MESG5	013	03171	MESG6	013	03203	MESG7	013	03204	IPAAP	013	00001	CNT1	013	00100	CNT2	013	00104	CNT3	013	00105
CNT4	013	00221	CNT5	013	00220	CNT6	013	00276	CNT7	013	00307	CNT8	013	00316	CNT9	013	00323	CNT10	013	00324
CNT12	013	00377	CNT10	013	00402	CNT14	013	00407	CNT15	013	00437	CNT16	013	00462	CNT17	013	00506	CNT18	013	00532
CNT19	013	00570	CNT19	013	00577	CNT20	013	00603	CNT21	013	00667	CNTC	013	00677	CNT22	013	00740	CNT23	013	00757
CNT24	013	00767	CNT30	013	01022	CNT32	013	01027	CNT25	013	01107	CNT33	013	01142	CNT34	013	01177	CNT35	013	01233
CNT39	013	01266	CNT36	013	01320	CNT27	013	01307	CNT37	013	01422	CNT38	013	01427	CNT39	013	01507	CNT40	013	01542
CNT40	013	01577	CNT29	013	01633	CNT41	013	01666	CNT42	013	01723	CNT43	013	01727	CNT44	013	01772	CNT45	013	02010
CNT45	013	02044	CNT49	013	02077	CNT46	013	02113	CNT50	013	02132	CNT47	013	02137	CNT48	013	02141	CNT49	013	02167
CNT46	013	02202	CNT55	013	02222	CNTD	013	02334	CNT54	013	02403	EX17	013	02412	CNT51	013	02443	HPM10	013	02525
AL30R	013	02534	IRANA	013	02563	QUA01	013	02630	QUA02	013	02634	QUA03	013	02643	QUA04	013	02649	IR16	013	02657
ERROR	013	02672	LPLSA	013	02714	LNPM1	013	03257	LPLSB	013	02727	LNPM2	013	03263	LNPM3	013	03301	LNPM4	013	03302
LNPM5	013	03437	LNPM6	013	03464	LNPM7	013	03475	LNPM8	013	03482	LNPM9	013	03486	LNPM10	013	03487	LNPM11	013	03488
LNPM12	013	03507	LNPM13	013	03508	LNPM14	013	03511	LNPM15	013	03514	LNPM16	013	03517	LNPM17	013	03518	LNPM18	013	03519
LNPM19	013	03521	LNPM20	013	03522	LNPM21	013	03523	LNPM22	013	03524	LNPM23	013	03525	LNPM24	013	03526	LNPM25	013	03527

PROGRAM INDEX TABLE

LN1 001 001 013 1M2 001 002 013 1M3 001 003 013 1M4 001 004 013 1M5 001 005 013

WORD IN PROGRAM	14726	LOCATIONS USED BY PROGRAM (EXCLUSIVE OF COMMON STORAGE)	14701
COMMON INDEX BASE	00014	LOGICAL EQUIPMENT TABLE BASE	02520
FORMAT BASE	NONE	INPUT/OUTPUT LIST AREA BASE	NONE
COMMON STORAGE BASE	17752	PROGRAM TRANSFER VECTOR BASE	02524
PROCEDURE COMMAND BASE	1P44P 02563	RESERVE STORAGE BASE	07101
SUBROUTINE COMMAND BASE	PH11P 12142	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00017 12511	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00021 13115	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00026 13116	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00025 13117	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00027 13118	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00028 13119	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00029 13120	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00030 13121	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00031 13122	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00032 13123	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00033 13124	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00034 13125	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00035 13126	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00036 13127	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00037 13128	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00038 13129	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00039 13130	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00040 13131	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00041 13132	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00042 13133	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00043 13134	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00044 13135	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00045 13136	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00046 13137	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00047 13138	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00048 13139	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00049 13140	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00050 13141	RESERVE STORAGE BASE	NONE
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SUBROUTINE COMMAND BASE	00054 13145	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00055 13146	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00056 13147	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00057 13148	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00058 13149	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00059 13150	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00060 13151	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00061 13152	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00062 13153	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00063 13154	RESERVE STORAGE BASE	NONE
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SUBROUTINE COMMAND BASE	00068 13159	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00069 13160	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00070 13161	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00071 13162	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00072 13163	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00073 13164	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00074 13165	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00075 13166	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00076 13167	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00077 13168	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00078 13169	RESERVE STORAGE BASE	NONE
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SUBROUTINE COMMAND BASE	00201 13292	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00202 13293	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00203 13294	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00204 13295	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00205 13296	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00206 13297	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00207 13298	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00208 13299	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00209 13300	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00210 13301	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00211 13302	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00212 13303	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00213 13304	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00214 13305	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00215 13306	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00216 13307	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00217 13308	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00218 13309	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00219 13310	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00220 13311	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00221 13312	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00222 13313	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00223 13314	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00224 13315	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00225 13316	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00226 13317	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00227 13318	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00228 13319	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00229 13320	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00230 13321	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00231 13322	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00232 13323	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00233 13324	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00234 13325	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00235 13326	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00236 13327	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00237 13328	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00238 13329	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00239 13330	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00240 13331	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00241 13332	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00242 13333	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00243 13334	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00244 13335	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00245 13336	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00246 13337	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00247 13338	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00248 13339	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00249 13340	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00250 13341	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00251 13342	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00252 13343	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00253 13344	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00254 13345	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00255 13346	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00256 13347	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00257 13348	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00258 13349	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00259 13350	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00260 13351	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00261 13352	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00262 13353	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00263 13354	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00264 13355	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00265 13356	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00266 13357	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00267 13358	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00268 13359	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00269 13360	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00270 13361	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00271 13362	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00272 13363	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00273 13364	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	00274 13365	RESERVE STORAGE BASE	NONE
SUBROUTINE COMMAND BASE	002		

SUPROUTINE 00051 MSTR
COMMAND BASE 15721

NONE

RESERVE STORAGE BASF

INITIAL PROGRAM ENTRY POINT 02564

Comment: The following printout is part of an actual data run and this coincides with the complete Range Error vs. Time and Target Plots included in the figures (See Figures 3a and 6).

THIS PRINTOUT OF THE JOURNAL PREDICTION ANALYZER AND PLOTTER PROGRAM RESULTS CONTAINS THE FOLLOWING INFORMATION:

NOTE: ANTENNA PAIR # 1 DENOTES U-120 ANTENNA
 ANTENNA PAIR # 2 DENOTES U-240 ANTENNA
 PROPAGATION MODE # 1 DENOTES LINE-HOP F
 PROPAGATION MODE # 2 DENOTES LINE-HOP F
 PROPAGATION MODE # 3 DENOTES LINE-HOP F

RUNNING AVERAGES FOR LINE # 24 HOURS RANGE M.H.I. KNOWN LOCATION AVERAGES									
30-MINUTE RUNNING AVERAGES					20-MINUTE RUNNING AVERAGES				
AVERAGE	TIME	POINTS	AVERAGE	TIME	POINTS	AVERAGE	TIME	POINTS	AVERAGE
20.405	1.084	1.00	20.405	1.084	1.00	20.405	1.084	1.00	20.405
20.592	1.096	2.00	20.592	1.096	2.00	20.592	1.096	2.00	20.592
27.004	1.103	3.00	27.004	1.103	3.00	27.004	1.103	3.00	27.004
21.105	1.111	4.00	21.105	1.111	4.00	21.105	1.111	4.00	21.105
18.074	1.123	5.00	18.074	1.123	5.00	18.074	1.123	5.00	18.074
20.412	1.127	6.00	20.412	1.127	6.00	20.412	1.127	6.00	20.412
19.285	1.134	7.00	19.285	1.134	7.00	19.285	1.134	7.00	19.285
20.054	1.153	8.00	20.054	1.153	8.00	20.054	1.153	8.00	20.054
22.317	1.157	9.00	22.317	1.157	9.00	22.317	1.157	9.00	22.317
20.062	1.160	10.00	20.062	1.160	10.00	20.062	1.160	10.00	20.062
21.539	1.165	11.00	21.539	1.165	11.00	21.539	1.165	11.00	21.539
20.212	1.169	12.00	20.212	1.169	12.00	20.212	1.169	12.00	20.212
21.006	1.176	13.00	21.006	1.176	13.00	21.006	1.176	13.00	21.006
21.346	1.181	14.00	21.346	1.181	14.00	21.346	1.181	14.00	21.346
23.268	1.186	15.00	23.268	1.186	15.00	23.268	1.186	15.00	23.268
22.568	1.216	16.00	22.568	1.216	16.00	22.568	1.216	16.00	22.568
22.715	1.230	17.00	22.715	1.230	17.00	22.715	1.230	17.00	22.715
23.963	1.236	18.00	23.963	1.236	18.00	23.963	1.236	18.00	23.963
22.869	1.242	19.00	22.869	1.242	19.00	22.869	1.242	19.00	22.869
23.746	1.247	20.00	23.746	1.247	20.00	23.746	1.247	20.00	23.746
23.637	1.251	21.00	23.637	1.251	21.00	23.637	1.251	21.00	23.637
23.043	1.274	22.00	23.043	1.274	22.00	23.043	1.274	22.00	23.043
23.311	1.286	23.00	23.311	1.286	23.00	23.311	1.286	23.00	23.311
24.052	1.291	24.00	24.052	1.291	24.00	24.052	1.291	24.00	24.052
24.246	1.295	25.00	24.246	1.295	25.00	24.246	1.295	25.00	24.246
24.520	1.322	26.00	24.520	1.322	26.00	24.520	1.322	26.00	24.520
24.353	1.330	27.00	24.353	1.330	27.00	24.353	1.330	27.00	24.353
23.729	1.359	1.00	23.729	1.359	1.00	23.729	1.359	1.00	23.729
23.775	1.364	2.00	23.775	1.364	2.00	23.775	1.364	2.00	23.775
23.987	1.367	3.00	23.987	1.367	3.00	23.987	1.367	3.00	23.987
24.164	1.374	4.00	24.164	1.374	4.00	24.164	1.374	4.00	24.164
24.367	1.382	5.00	24.367	1.382	5.00	24.367	1.382	5.00	24.367
24.684	1.386	6.00	24.684	1.386	6.00	24.684	1.386	6.00	24.684
24.659	1.389	7.00	24.659	1.389	7.00	24.659	1.389	7.00	24.659
25.162	1.392	8.00	25.162	1.392	8.00	25.162	1.392	8.00	25.162
25.020	1.399	9.00	25.020	1.399	9.00	25.020	1.399	9.00	25.020
25.020	1.406	10.00	25.020	1.406	10.00	25.020	1.406	10.00	25.020
25.264	1.431	11.00	25.264	1.431	11.00	25.264	1.431	11.00	25.264
25.666	1.441	12.00	25.666	1.441	12.00	25.666	1.441	12.00	25.666

20.14	1.445	13.00	20.54	1.445	13.00	25.651	1.445	40.00
27.44	1.445	14.00	27.044	1.449	14.00	25.545	1.449	41.00
29.14	1.454	15.00	27.119	1.454	15.00	26.020	1.454	42.00
20.47	1.405	16.00	24.478	1.405	16.00	25.408	1.405	43.00
20.23	1.557	1.00	27.945	1.557	17.00	20.236	1.557	1.00
30.11	1.580	2.00	27.080	1.580	18.00	30.114	1.580	2.00
30.07	1.585	3.00	27.730	1.585	19.00	30.074	1.585	3.00
25.44	1.546	4.00	27.010	1.546	20.00	25.442	1.546	4.00
1.602	1.602	5.00	27.142	1.602	21.00	27.142	1.602	5.00
24.24	1.606	6.00	27.337	1.606	22.00	24.246	1.606	6.00
25.40	1.612	7.00	27.003	1.612	23.00	25.401	1.612	7.00
27.40	1.616	8.00	27.214	1.616	24.00	27.406	1.616	8.00
20.14	1.623	9.00	27.708	1.623	25.00	20.140	1.623	9.00
25.41	1.631	10.00	27.057	1.631	26.00	25.410	1.631	10.00
23.44	1.636	11.00	26.217	1.636	27.00	23.440	1.636	11.00
22.07	1.653	12.00	26.120	1.653	28.00	22.077	1.653	12.00
23.52	1.658	13.00	27.056	1.658	29.00	23.522	1.658	13.00
22.05	1.663	14.00	27.401	1.663	30.00	22.057	1.663	14.00
5.14	1.680	1.00	27.141	1.680	1.00	5.140	1.680	1.00
12.44	1.684	2.00	12.030	1.684	2.00	12.440	1.684	2.00
14.44	1.690	3.00	14.440	1.690	3.00	14.440	1.690	3.00
14.00	1.700	4.00	14.000	1.700	4.00	14.000	1.700	4.00
24.34	1.708	5.00	24.340	1.708	5.00	24.340	1.708	5.00
25.44	1.712	6.00	25.440	1.712	6.00	25.440	1.712	6.00
20.14	1.717	7.00	20.140	1.717	7.00	20.140	1.717	7.00
20.44	1.722	8.00	20.440	1.722	8.00	20.440	1.722	8.00
20.40	1.728	9.00	20.400	1.728	9.00	20.400	1.728	9.00
25.04	1.734	10.00	25.040	1.734	10.00	25.040	1.734	10.00
25.43	1.741	11.00	25.430	1.741	11.00	25.430	1.741	11.00
20.43	1.747	12.00	20.430	1.747	12.00	20.430	1.747	12.00
25.01	1.761	13.00	25.010	1.761	13.00	25.010	1.761	13.00
24.24	1.768	14.00	24.240	1.768	14.00	24.240	1.768	14.00
22.42	1.773	15.00	22.420	1.773	15.00	22.420	1.773	15.00
23.27	1.782	16.00	23.270	1.782	16.00	23.270	1.782	16.00
24.27	1.800	17.00	24.270	1.800	17.00	24.270	1.800	17.00
25.70	1.806	18.00	25.700	1.806	18.00	25.700	1.806	18.00
11.47	1.836	1.00	11.470	1.836	1.00	11.470	1.836	1.00
25.24	1.886	2.00	25.240	1.886	2.00	25.240	1.886	2.00
20.00	1.875	3.00	20.000	1.875	3.00	20.000	1.875	3.00
25.34	1.884	4.00	25.340	1.884	4.00	25.340	1.884	4.00
20.74	1.892	5.00	20.740	1.892	5.00	20.740	1.892	5.00
25.14	1.906	6.00	25.140	1.906	6.00	25.140	1.906	6.00
25.14	1.912	7.00	25.140	1.912	7.00	25.140	1.912	7.00
25.24	1.920	8.00	25.240	1.920	8.00	25.240	1.920	8.00
20.74	1.930	9.00	20.740	1.930	9.00	20.740	1.930	9.00
20.00	1.930	10.00	20.000	1.930	10.00	20.000	1.930	10.00
25.46	1.942	11.00	25.460	1.942	11.00	25.460	1.942	11.00
23.46	1.944	12.00	23.460	1.944	12.00	23.460	1.944	12.00
24.75	1.954	13.00	24.750	1.954	13.00	24.750	1.954	13.00
23.07	1.971	14.00	23.070	1.971	14.00	23.070	1.971	14.00
23.00	1.976	15.00	23.000	1.976	15.00	23.000	1.976	15.00
22.57	1.980	16.00	22.570	1.980	16.00	22.570	1.980	16.00
21.47	1.986	17.00	21.470	1.986	17.00	21.470	1.986	17.00

15.000	3.928	5.00	24.956	3.928	14.00	24.474	3.928	14.00
21.777	4.032	1.00	21.776	4.032	1.00	21.776	4.032	1.00
24.795	4.041	2.00	24.793	4.041	2.00	24.793	4.041	2.00
24.077	4.071	3.00	24.072	4.071	3.00	24.072	4.071	3.00
25.517	4.079	4.00	25.516	4.079	4.00	25.516	4.079	4.00
24.812	4.088	5.00	24.812	4.088	5.00	24.812	4.088	5.00
25.013	4.104	6.00	25.011	4.104	6.00	25.011	4.104	6.00
31.508	4.122	7.00	31.508	4.122	7.00	31.508	4.122	7.00
33.350	4.140	8.00	33.353	4.140	8.00	33.353	4.140	8.00
30.754	4.156	9.00	30.754	4.156	9.00	30.754	4.156	9.00
30.845	4.352	1.00	30.845	4.352	1.00	30.772	4.352	1.00
24.375	4.371	2.00	24.373	4.371	2.00	24.373	4.371	2.00
33.405	4.401	3.00	33.405	4.401	3.00	31.440	4.401	3.00
34.724	4.416	4.00	34.764	4.416	4.00	33.223	4.416	4.00
30.704	4.424	5.00	30.734	4.424	5.00	33.607	4.424	5.00
37.033	4.450	6.00	37.055	4.450	6.00	33.277	4.450	6.00
30.515	4.462	7.00	30.503	4.462	7.00	34.147	4.462	7.00
1.237	4.500	1.00	34.564	4.500	8.00	7.237	4.500	1.00
17.640	4.522	2.00	33.842	4.522	9.00	17.546	4.522	2.00
14.374	4.535	3.00	37.464	4.535	10.00	28.373	4.535	3.00
14.450	4.566	4.00	31.354	4.566	11.00	18.450	4.566	4.00
10.041	4.590	5.00	24.960	4.590	12.00	14.041	4.590	5.00
20.052	4.708	1.00	27.902	4.708	1.00	14.903	4.708	6.00
27.677	4.712	2.00	27.577	4.712	2.00	20.041	4.712	7.00

OVERALL AVERAGES: TOTAL AVERAGE = 25.99 RMS AVERAGE = 14.51
TOTAL NUMBER OF POINTS = 271.00

THIS PROGRAM IS THE THERMAL PREDICTION ANALYZER - A PLOTTER PROGRAM RESULTS CONTAINS THE FOLLOWING INFORMATION:

UNIT: UNIFORM PAIR # 1 DEBITES 0-120 - TENNA
 UNIFORM PAIR # 2 DEBITES 0-24 - TENNA
 PROPAGATION CODE # 1 DEBITES 1-20000
 PROPAGATION CODE # 2 DEBITES 1-20000
 PROPAGATION CODE # 3 DEBITES 1-20000

10-MINUTE AVERAGES FOR TIME 1				24-HOUR RANGE ERROR AVERAGES				30-MINUTE RUNNING AVERAGES			
AVERAGE	TIME	POINTS	AVERAGE	TIME	POINTS	AVERAGE	TIME	AVERAGE	TIME	POINTS	AVERAGE
-20.000	1.004	1.000	-20.000	1.004	1.000	-20.000	1.004	-20.000	1.004	1.000	1.000
-20.000	1.006	2.000	-20.000	1.006	2.000	-20.000	1.006	-20.000	1.006	2.000	2.000
0.000	1.008	3.000	0.000	1.008	3.000	0.000	1.008	0.000	1.008	3.000	3.000
0.000	1.011	4.000	0.000	1.011	4.000	0.000	1.011	0.000	1.011	4.000	4.000
2.000	1.013	5.000	2.000	1.013	5.000	2.000	1.013	2.000	1.013	5.000	5.000
6.000	1.017	6.000	6.000	1.017	6.000	6.000	1.017	6.000	1.017	6.000	6.000
4.200	1.019	7.000	4.200	1.019	7.000	4.200	1.019	4.200	1.019	7.000	7.000
0.000	1.023	8.000	0.000	1.023	8.000	0.000	1.023	0.000	1.023	8.000	8.000
5.000	1.027	9.000	5.000	1.027	9.000	5.000	1.027	5.000	1.027	9.000	9.000
4.500	1.031	10.000	4.500	1.031	10.000	4.500	1.031	4.500	1.031	10.000	10.000
6.000	1.035	11.000	6.000	1.035	11.000	6.000	1.035	6.000	1.035	11.000	11.000
.....											
0.000	1.039	1.000	0.000	1.039	1.000	0.000	1.039	0.000	1.039	1.000	12.000
10.000	1.043	2.000	10.000	1.043	2.000	10.000	1.043	10.000	1.043	2.000	13.000
10.000	1.047	3.000	10.000	1.047	3.000	10.000	1.047	10.000	1.047	3.000	14.000
20.000	1.051	4.000	20.000	1.051	4.000	20.000	1.051	20.000	1.051	4.000	15.000
10.000	1.055	5.000	10.000	1.055	5.000	10.000	1.055	10.000	1.055	5.000	16.000
20.000	1.059	6.000	20.000	1.059	6.000	20.000	1.059	20.000	1.059	6.000	17.000
20.000	1.063	7.000	20.000	1.063	7.000	20.000	1.063	20.000	1.063	7.000	18.000
20.000	1.067	8.000	20.000	1.067	8.000	20.000	1.067	20.000	1.067	8.000	19.000
22.000	1.071	9.000	22.000	1.071	9.000	22.000	1.071	22.000	1.071	9.000	20.000
10.000	1.075	10.000	10.000	1.075	10.000	10.000	1.075	10.000	1.075	10.000	21.000
15.000	1.079	11.000	15.000	1.079	11.000	15.000	1.079	15.000	1.079	11.000	22.000
12.000	1.083	12.000	12.000	1.083	12.000	12.000	1.083	12.000	1.083	12.000	23.000
0.000	1.087	13.000	0.000	1.087	13.000	0.000	1.087	0.000	1.087	13.000	24.000
0.000	1.091	14.000	0.000	1.091	14.000	0.000	1.091	0.000	1.091	14.000	25.000
0.000	1.095	15.000	0.000	1.095	15.000	0.000	1.095	0.000	1.095	15.000	26.000
0.000	1.099	16.000	0.000	1.099	16.000	0.000	1.099	0.000	1.099	16.000	27.000
.....											
0.000	1.099	1.000	0.000	1.099	1.000	0.000	1.099	0.000	1.099	1.000	28.000
0.000	1.103	2.000	0.000	1.103	2.000	0.000	1.103	0.000	1.103	2.000	29.000
0.000	1.107	3.000	0.000	1.107	3.000	0.000	1.107	0.000	1.107	3.000	30.000
0.000	1.111	4.000	0.000	1.111	4.000	0.000	1.111	0.000	1.111	4.000	31.000
0.000	1.115	5.000	0.000	1.115	5.000	0.000	1.115	0.000	1.115	5.000	32.000
0.000	1.119	6.000	0.000	1.119	6.000	0.000	1.119	0.000	1.119	6.000	33.000
0.000	1.123	7.000	0.000	1.123	7.000	0.000	1.123	0.000	1.123	7.000	34.000
0.000	1.127	8.000	0.000	1.127	8.000	0.000	1.127	0.000	1.127	8.000	35.000
0.000	1.131	9.000	0.000	1.131	9.000	0.000	1.131	0.000	1.131	9.000	36.000
0.000	1.135	10.000	0.000	1.135	10.000	0.000	1.135	0.000	1.135	10.000	37.000
0.000	1.139	11.000	0.000	1.139	11.000	0.000	1.139	0.000	1.139	11.000	38.000
0.000	1.143	1.000	0.000	1.143	1.000	0.000	1.143	0.000	1.143	1.000	39.000
0.000	1.147	2.000	0.000	1.147	2.000	0.000	1.147	0.000	1.147	2.000	40.000
0.000	1.151	3.000	0.000	1.151	3.000	0.000	1.151	0.000	1.151	3.000	41.000
0.000	1.155	4.000	0.000	1.155	4.000	0.000	1.155	0.000	1.155	4.000	42.000
0.000	1.159	5.000	0.000	1.159	5.000	0.000	1.159	0.000	1.159	5.000	43.000
0.000	1.163	6.000	0.000	1.163	6.000	0.000	1.163	0.000	1.163	6.000	44.000
0.000	1.167	7.000	0.000	1.167	7.000	0.000	1.167	0.000	1.167	7.000	45.000
0.000	1.171	8.000	0.000	1.171	8.000	0.000	1.171	0.000	1.171	8.000	46.000
0.000	1.175	9.000	0.000	1.175	9.000	0.000	1.175	0.000	1.175	9.000	47.000
0.000	1.179	10.000	0.000	1.179	10.000	0.000	1.179	0.000	1.179	10.000	48.000
0.000	1.183	11.000	0.000	1.183	11.000	0.000	1.183	0.000	1.183	11.000	49.000
0.000	1.187	1.000	0.000	1.187	1.000	0.000	1.187	0.000	1.187	1.000	50.000
0.000	1.191	2.000	0.000	1.191	2.000	0.000	1.191	0.000	1.191	2.000	51.000
0.000	1.195	3.000	0.000	1.195	3.000	0.000	1.195	0.000	1.195	3.000	52.000
0.000	1.199	4.000	0.000	1.199	4.000	0.000	1.199	0.000	1.199	4.000	53.000
0.000	1.203	5.000	0.000	1.203	5.000	0.000	1.203	0.000	1.203	5.000	54.000
0.000	1.207	6.000	0.000	1.207	6.000	0.000	1.207	0.000	1.207	6.000	55.000
0.000	1.211	7.000	0.000	1.211	7.000	0.000	1.211	0.000	1.211	7.000	56.000
0.000	1.215	8.000	0.000	1.215	8.000	0.000	1.215	0.000	1.215	8.000	57.000
0.000	1.219	9.000	0.000	1.219	9.000	0.000	1.219	0.000	1.219	9.000	58.000
0.000	1.223	10.000	0.000	1.223	10.000	0.000	1.223	0.000	1.223	10.000	59.000
0.000	1.227	11.000	0.000	1.227	11.000	0.000	1.227	0.000	1.227	11.000	60.000
0.000	1.231	1.000	0.000	1.231	1.000	0.000	1.231	0.000	1.231	1.000	61.000
0.000	1.235	2.000	0.000	1.235	2.000	0.000	1.235	0.000	1.235	2.000	62.000
0.000	1.239	3.000	0.000	1.239	3.000	0.000	1.239	0.000	1.239	3.000	63.000
0.000	1.243	4.000	0.000	1.243	4.000	0.000	1.243	0.000	1.243	4.000	64.000
0.000	1.247	5.000	0.000	1.247	5.000	0.000	1.247	0.000	1.247	5.000	65.000
0.000	1.251	6.000	0.000	1.251	6.000	0.000	1.251	0.000	1.251	6.000	66.000
0.000	1.255	7.000	0.000	1.255	7.000	0.000	1.255	0.000	1.255	7.000	67.000
0.000	1.259	8.000	0.000	1.259	8.000	0.000	1.259	0.000	1.259	8.000	68.000
0.000	1.263	9.000	0.000	1.263	9.000	0.000	1.263	0.000	1.263	9.000	69.000
0.000	1.267	10.000	0.000	1.267	10.000	0.000	1.267	0.000	1.267	10.000	70.000
0.000	1.271	11.000	0.000	1.271	11.000	0.000	1.271	0.000	1.271	11.000	71.000
0.000	1.275	1.000	0.000	1.275	1.000	0.000	1.275	0.000	1.275	1.000	72.000
0.000	1.279	2.000	0.000	1.279	2.000	0.000	1.279	0.000	1.279	2.000	73.000
0.000	1.283	3.000	0.000	1.283	3.000	0.000	1.283	0.000	1.283	3.000	74.000
0.000	1.287	4.000	0.000	1.287	4.000	0.000	1.287	0.000	1.287	4.000	75.000
0.000	1.291	5.000	0.000	1.291	5.000	0.000	1.291	0.000	1.291	5.000	76.000
0.000	1.295	6.000	0.000	1.295	6.000	0.000	1.295	0.000	1.295	6.000	77.000
0.000	1.299	7.000	0.000	1.299	7.000	0.000	1.299	0.000	1.299	7.000	78.000
0.000	1.303	8.000	0.000	1.303	8.000	0.000	1.303	0.000	1.303	8.000	79.000
0.000											

-9.612	1.445	13.00	-7.015	1.445	13.00	0.625	1.445	40.00
-10.357	1.449	14.00	-10.357	1.449	14.00	0.122	1.449	41.00
-6.487	1.459	15.00	-6.487	1.459	15.00	1.116	1.459	42.00
-7.501	1.465	16.00	-7.500	1.465	16.00	0.699	1.465	43.00
20.001	1.537	1.00	-5.862	1.537	17.00	20.000	1.537	1.00
30.001	1.540	2.00	-5.335	1.540	18.00	30.000	1.540	2.00
30.001	1.565	3.00	-4.737	1.565	19.00	10.000	1.565	3.00
5.000	1.596	4.00	-3.006	1.596	20.00	5.000	1.596	4.00
11.000	1.602	5.00	-3.095	1.602	21.00	11.000	1.602	5.00
7.001	1.606	6.00	-5.409	1.606	22.00	7.500	1.606	6.00
11.429	1.612	7.00	-1.739	1.612	23.00	11.429	1.612	7.00
5.001	1.616	8.00	-5.333	1.616	24.00	5.000	1.616	8.00
6.111	1.623	9.00	-2.600	1.623	25.00	6.111	1.623	9.00
7.001	1.631	10.00	-1.923	1.631	26.00	7.000	1.631	10.00
6.364	1.636	11.00	-1.852	1.636	27.00	6.364	1.636	11.00
7.003	1.653	12.00	-1.250	1.653	28.00	7.003	1.653	12.00
6.447	1.659	13.00	-1.172	1.659	29.00	6.446	1.659	13.00
6.214	1.665	14.00	-1.167	1.665	30.00	6.214	1.665	14.00
5.001	1.680	1.00	-5.000	1.680	1.00	7.333	1.680	15.00
7.501	1.684	2.00	7.500	1.684	2.00	6.122	1.684	16.00
-10.001	1.690	3.00	-10.000	1.690	3.00	5.000	1.690	17.00
-7.501	1.700	4.00	-7.500	1.700	4.00	4.722	1.700	18.00
-15.001	1.704	5.00	-15.000	1.704	5.00	2.102	1.704	19.00
-17.501	1.712	6.00	-17.500	1.712	6.00	0.500	1.712	20.00
-10.714	1.717	7.00	-11.714	1.717	7.00	1.902	1.717	21.00
-13.125	1.722	8.00	-13.125	1.722	8.00	0.457	1.722	22.00
-6.844	1.726	9.00	-6.844	1.726	9.00	1.522	1.726	23.00
-6.000	1.734	10.00	-6.000	1.734	10.00	2.292	1.734	24.00
-3.630	1.741	11.00	-3.630	1.741	11.00	3.000	1.741	25.00
-6.467	1.747	12.00	-6.467	1.747	12.00	1.346	1.747	26.00
-6.536	1.761	13.00	-6.536	1.761	13.00	1.111	1.761	27.00
-5.000	1.766	14.00	-5.000	1.766	14.00	1.607	1.766	28.00
-4.467	1.773	15.00	-4.467	1.773	15.00	1.552	1.773	29.00
-2.500	1.792	16.00	-2.500	1.792	16.00	2.500	1.792	30.00
-4.700	1.800	17.00	-4.700	1.800	17.00	1.129	1.800	31.00
-7.222	1.806	18.00	-7.222	1.806	18.00	-0.469	1.806	32.00
10.001	1.836	1.00	-6.316	1.836	19.00	-0.152	1.836	33.00
-15.001	1.866	2.00	-6.000	1.866	20.00	-1.324	1.866	34.00
0.001	1.875	3.00	-6.190	1.875	21.00	-0.429	1.875	35.00
0.001	1.884	4.00	-5.909	1.884	22.00	-0.417	1.884	36.00
-5.000	1.892	5.00	-7.609	1.892	23.00	-1.622	1.892	37.00
-12.506	1.906	6.00	-4.542	1.906	24.00	-2.364	1.906	38.00
-7.457	1.916	7.00	-7.460	1.916	25.00	-1.795	1.916	39.00
-3.750	1.923	8.00	-6.154	1.923	26.00	-1.125	1.923	40.00
-6.467	1.930	9.00	-7.037	1.930	27.00	-1.429	1.930	41.00
-3.501	1.936	10.00	-5.893	1.936	28.00	-1.190	1.936	42.00
-4.093	1.942	11.00	-6.034	1.942	29.00	-1.395	1.942	43.00
-4.563	1.947	12.00	-6.167	1.947	30.00	-1.591	1.947	44.00
-7.700	1.964	13.00	-7.258	1.964	31.00	-2.444	1.964	45.00
-6.780	1.970	14.00	-7.031	1.970	32.00	-2.391	1.970	46.00
-6.467	1.976	15.00	-7.879	1.976	33.00	-3.085	1.976	47.00
-6.125	1.980	16.00	-7.647	1.980	34.00	-3.021	1.980	48.00
-7.447	1.986	17.00	-7.429	1.986	35.00	-2.959	1.986	49.00

-21.00	2.693	3.00	-21.0000	2.693	3.00	-0.739	2.693	15.00
-24.25	2.710	4.00	-24.2500	2.710	4.00	-11.319	2.710	16.00
-27.50	2.721	5.00	-27.5000	2.721	5.00	-11.647	2.721	17.00
-30.75	2.743	6.00	-30.7500	2.743	6.00	-11.056	2.743	18.00
-34.00	2.765	7.00	-34.0000	2.765	7.00	-9.526	2.765	19.00
-37.25	2.787	8.00	-37.2500	2.787	8.00	-7.951	2.787	20.00
-40.50	2.810	9.00	-40.5000	2.810	9.00	-6.333	2.810	21.00
-43.75	2.834	10.00	-43.7500	2.834	10.00	-4.655	2.834	22.00
-47.00	2.857	11.00	-47.0000	2.857	11.00	-3.014	2.857	23.00
-50.25	2.881	12.00	-50.2500	2.881	12.00	-1.323	2.881	24.00
-53.50	2.904	13.00	-53.5000	2.904	13.00	0.341	2.904	25.00
-56.75	2.928	14.00	-56.7500	2.928	14.00	1.942	2.928	26.00
-60.00	2.951	15.00	-60.0000	2.951	15.00	3.544	2.951	27.00
-63.25	2.975	16.00	-63.2500	2.975	16.00	5.146	2.975	28.00
-66.50	2.998	17.00	-66.5000	2.998	17.00	6.748	2.998	29.00
-69.75	3.022	18.00	-69.7500	3.022	18.00	8.350	3.022	30.00
-73.00	3.045	19.00	-73.0000	3.045	19.00	9.952	3.045	31.00
-76.25	3.069	20.00	-76.2500	3.069	20.00	11.554	3.069	32.00
-79.50	3.092	21.00	-79.5000	3.092	21.00	13.156	3.092	33.00
-82.75	3.116	22.00	-82.7500	3.116	22.00	14.758	3.116	34.00
-86.00	3.139	23.00	-86.0000	3.139	23.00	16.360	3.139	35.00
-89.25	3.163	24.00	-89.2500	3.163	24.00	17.962	3.163	36.00
-92.50	3.186	25.00	-92.5000	3.186	25.00	19.564	3.186	37.00
-95.75	3.210	26.00	-95.7500	3.210	26.00	21.166	3.210	38.00
-100.00	3.233	27.00	-100.0000	3.233	27.00	22.768	3.233	39.00
-103.25	3.257	28.00	-103.2500	3.257	28.00	24.370	3.257	40.00
-106.50	3.280	29.00	-106.5000	3.280	29.00	25.972	3.280	41.00
-109.75	3.304	30.00	-109.7500	3.304	30.00	27.574	3.304	42.00
-113.00	3.327	31.00	-113.0000	3.327	31.00	29.176	3.327	43.00
-116.25	3.351	32.00	-116.2500	3.351	32.00	30.778	3.351	44.00
-119.50	3.374	33.00	-119.5000	3.374	33.00	32.380	3.374	45.00
-122.75	3.398	34.00	-122.7500	3.398	34.00	33.982	3.398	46.00
-126.00	3.421	35.00	-126.0000	3.421	35.00	35.584	3.421	47.00
-129.25	3.445	36.00	-129.2500	3.445	36.00	37.186	3.445	48.00
-132.50	3.468	37.00	-132.5000	3.468	37.00	38.788	3.468	49.00
-135.75	3.492	38.00	-135.7500	3.492	38.00	40.390	3.492	50.00
-139.00	3.515	39.00	-139.0000	3.515	39.00	41.992	3.515	51.00
-142.25	3.539	40.00	-142.2500	3.539	40.00	43.594	3.539	52.00
-145.50	3.562	41.00	-145.5000	3.562	41.00	45.196	3.562	53.00
-148.75	3.586	42.00	-148.7500	3.586	42.00	46.798	3.586	54.00
-152.00	3.609	43.00	-152.0000	3.609	43.00	48.400	3.609	55.00
-155.25	3.633	44.00	-155.2500	3.633	44.00	49.992	3.633	56.00
-158.50	3.656	45.00	-158.5000	3.656	45.00	51.594	3.656	57.00
-161.75	3.680	46.00	-161.7500	3.680	46.00	53.196	3.680	58.00
-165.00	3.703	47.00	-165.0000	3.703	47.00	54.798	3.703	59.00
-168.25	3.727	48.00	-168.2500	3.727	48.00	56.400	3.727	60.00
-171.50	3.750	49.00	-171.5000	3.750	49.00	58.002	3.750	61.00
-174.75	3.774	50.00	-174.7500	3.774	50.00	59.604	3.774	62.00
-178.00	3.797	51.00	-178.0000	3.797	51.00	61.206	3.797	63.00
-181.25	3.821	52.00	-181.2500	3.821	52.00	62.808	3.821	64.00
-184.50	3.844	53.00	-184.5000	3.844	53.00	64.410	3.844	65.00
-187.75	3.868	54.00	-187.7500	3.868	54.00	66.012	3.868	66.00
-191.00	3.891	55.00	-191.0000	3.891	55.00	67.614	3.891	67.00
-194.25	3.915	56.00	-194.2500	3.915	56.00	69.216	3.915	68.00
-197.50	3.938	57.00	-197.5000	3.938	57.00	70.818	3.938	69.00
-200.75	3.962	58.00	-200.7500	3.962	58.00	72.420	3.962	70.00
-204.00	3.985	59.00	-204.0000	3.985	59.00	74.022	3.985	71.00
-207.25	4.009	60.00	-207.2500	4.009	60.00	75.624	4.009	72.00
-210.50	4.032	61.00	-210.5000	4.032	61.00	77.226	4.032	73.00
-213.75	4.056	62.00	-213.7500	4.056	62.00	78.828	4.056	74.00
-217.00	4.079	63.00	-217.0000	4.079	63.00	80.430	4.079	75.00
-220.25	4.103	64.00	-220.2500	4.103	64.00	82.032	4.103	76.00
-223.50	4.126	65.00	-223.5000	4.126	65.00	83.634	4.126	77.00
-226.75	4.150	66.00	-226.7500	4.150	66.00	85.236	4.150	78.00
-230.00	4.173	67.00	-230.0000	4.173	67.00	86.838	4.173	79.00
-233.25	4.197	68.00	-233.2500	4.197	68.00	88.440	4.197	80.00
-236.50	4.220	69.00	-236.5000	4.220	69.00	90.042	4.220	81.00
-239.75	4.244	70.00	-239.7500	4.244	70.00	91.644	4.244	82.00
-243.00	4.267	71.00	-243.0000	4.267	71.00	93.246	4.267	83.00
-246.25	4.291	72.00	-246.2500	4.291	72.00	94.848	4.291	84.00
-249.50	4.314	73.00	-249.5000	4.314	73.00	96.450	4.314	85.00
-252.75	4.338	74.00	-252.7500	4.338	74.00	98.052	4.338	86.00
-256.00	4.361	75.00	-256.0000	4.361	75.00	99.654	4.361	87.00
-259.25	4.385	76.00	-259.2500	4.385	76.00	101.256	4.385	88.00
-262.50	4.408	77.00	-262.5000	4.408	77.00	102.858	4.408	89.00
-265.75	4.432	78.00	-265.7500	4.432	78.00	104.460	4.432	90.00
-269.00	4.455	79.00	-269.0000	4.455	79.00	106.062	4.455	91.00
-272.25	4.479	80.00	-272.2500	4.479	80.00	107.664	4.479	92.00
-275.50	4.502	81.00	-275.5000	4.502	81.00	109.266	4.502	93.00
-278.75	4.526	82.00	-278.7500	4.526	82.00	110.868	4.526	94.00
-282.00	4.549	83.00	-282.0000	4.549	83.00	112.470	4.549	95.00
-285.25	4.573	84.00	-285.2500	4.573	84.00	114.072	4.573	96.00
-288.50	4.596	85.00	-288.5000	4.596	85.00	115.674	4.596	97.00
-291.75	4.620	86.00	-291.7500	4.620	86.00	117.276	4.620	98.00
-295.00	4.643	87.00	-295.0000	4.643	87.00	118.878	4.643	99.00
-298.25	4.667	88.00	-298.2500	4.667	88.00	120.480	4.667	100.00
-301.50	4.690	89.00	-301.5000	4.690	89.00	122.082	4.690	101.00
-304.75	4.714	90.00	-304.7500	4.714	90.00	123.684	4.714	102.00
-308.00	4.737	91.00	-308.0000	4.737	91.00	125.286	4.737	103.00
-311.25	4.761	92.00	-311.2500	4.761	92.00	126.888	4.761	104.00
-314.50	4.784	93.00	-314.5000	4.784	93.00	128.490	4.784	105.00
-317.75	4.808	94.00	-317.7500	4.808	94.00	130.092	4.808	106.00
-321.00	4.831	95.00	-321.0000	4.831	95.00	131.694	4.831	107.00
-324.25	4.855	96.00	-324.2500	4.855	96.00	133.296	4.855	108.00
-327.50	4.878	97.00	-327.5000	4.878	97.00	134.898	4.878	109.00
-330.75	4.902	98.00	-330.7500	4.902	98.00	136.500	4.902	110.00
-334.00	4.925	99.00	-334.0000	4.925	99.00	138.102	4.925	111.00
-337.25	4.949	100.00	-337.2500	4.949	100.00	139.704	4.949	112.00
-340.50	4.972	101.00	-340.5000	4.972	101.00	141.306	4.972	113.00
-343.75	4.996	102.00	-343.7500	4.996	102.00	142.908	4.996	114.00
-347.00	5.019	103.00	-347.0000	5.019	103.00	144.510	5.019	115.00
-350.25	5.043	104.00	-350.2500	5.043	104.00	146.112	5.043	116.00
-353.50	5.066	105.00	-353.5000	5.066	105.00	147.714	5.066	117.00
-356.75	5.090	106.00	-356.7500	5.090	106.00	149.316	5.090	118.00
-360.00	5.113	107.00	-360.0000	5.113	107.00	150.918	5.113	119.00
-363.25	5.137	108.00	-363.2500	5.137	108.00	152.520	5.137	120.00
-366.50	5.160	109.00	-366.5000	5.160	109.00	154.122	5.160	121.00
-369.75	5.184	110.00	-369.7500	5.184	110.00	155.724	5.184	122.00
-373.00	5.207	111.00	-373.0000	5.207	111.00	157.326	5.207	123.00
-376.25	5.231	112.00	-376.2500	5.231	112.00	158.928	5.231	124.00
-379.50	5.254	113.00	-379.5000	5.254	113.00	160.530	5.254	125.00
-382.75	5.278	114.00	-382.7500	5.278	114.00	162.132	5.278	126.00
-386.00	5.301	115.00	-386.0000	5.301	115.00	163.734	5.301	127.00
-389.25	5.325	116.00	-389.2500	5.325	116.00	165.336	5.325	128.00
-392.50	5.348	117.00	-392.5000	5.348	117.00	166.938	5.348	129.00
-395.75	5.372	118.00	-395.7500	5.372	118.00	168.540	5.372	130.00
-400.00	5.395	119.00	-400.0000	5.395	119.00	170.142	5.395	131.00
-403.25	5.419	120.00	-403.2500	5.419	120.00	171.744	5.419	132.00
-406.50	5.442	121.00	-406.5000	5.442	121.00	173.346	5.442	133.00
-409.75	5.466	122.00	-409.7500	5.466	122.00	174.948	5.466	134.00
-413.00	5.489	123.00	-413.0000	5.489	123.00	176.550	5.489	135.00
-416.25	5.513	124.00	-416.2500	5.513	124.00	178.152	5.513	136.00
-419.50	5.536	125.00	-419.5000	5.536	125			

-19.714	3.154	7.00	3.134	7.00
-23.500	3.152	8.00	3.132	8.00
-20.000	3.150	9.00	3.130	9.00
-10.000	3.148	10.00	3.128	10.00
-20.000	3.146	1.00	3.126	1.00
-32.500	3.173	2.00	3.153	2.00
-16.500	3.170	3.00	3.150	3.00
-3.750	3.191	4.00	3.191	4.00
-5.000	3.212	5.00	3.212	5.00
-10.833	3.233	6.00	3.233	6.00
-5.714	3.267	7.00	3.267	7.00
-1.250	3.280	8.00	3.280	8.00
-5.447	3.285	9.00	3.285	9.00
-7.000	3.292	10.00	3.292	10.00
-10.000	3.296	11.00	3.296	11.00
-11.250	3.303	12.00	3.303	12.00
-12.494	3.315	13.00	3.315	13.00
0.000	3.327	1.00	3.327	1.00
0.000	3.351	2.00	3.351	2.00
15.000	3.367	3.00	3.367	3.00
0.000	3.373	4.00	3.373	4.00
9.000	3.381	5.00	3.381	5.00
0.000	3.400	6.00	3.400	6.00
-7.443	3.416	7.00	3.416	7.00
-6.250	3.422	8.00	3.422	8.00
-11.113	3.420	9.00	3.420	9.00
-7.400	3.432	10.00	3.432	10.00
-5.455	3.452	11.00	3.452	11.00
-8.750	3.459	12.00	3.459	12.00
-6.525	3.466	13.00	3.466	13.00
-8.577	3.476	14.00	3.476	14.00
-9.667	3.483	15.00	3.483	15.00
-11.500	3.491	16.00	3.491	16.00
-13.235	3.498	17.00	3.498	17.00
-20.000	3.533	1.00	3.533	1.00
-45.000	3.574	2.00	3.574	2.00
-35.333	3.528	3.00	3.528	3.00
-22.400	3.638	4.00	3.638	4.00
-20.000	3.669	1.00	3.669	1.00
-45.000	3.685	2.00	3.685	2.00
-45.000	3.702	3.00	3.702	3.00
-43.750	3.711	4.00	3.711	4.00
-40.000	3.721	5.00	3.721	5.00
-41.467	3.735	6.00	3.735	6.00
-40.000	3.748	7.00	3.748	7.00
-35.750	3.755	8.00	3.755	8.00
0.000	3.805	1.00	3.805	1.00
5.000	3.800	2.00	3.800	2.00
1.667	3.804	3.00	3.804	3.00
7.500	3.817	4.00	3.817	4.00

10.00	5.00	15.00	14.00	20.00	5.00	14.00
-21.000	4.032	-20.000	4.032	-20.000	4.032	14.00
-17.500	4.041	-17.500	4.041	-17.500	4.041	1.00
-16.000	4.071	-16.000	4.071	-16.000	4.071	2.00
-14.750	4.079	-14.750	4.079	-14.750	4.079	3.00
-14.000	4.088	-14.000	4.088	-14.000	4.088	4.00
-12.500	4.104	-12.500	4.104	-12.500	4.104	5.00
-12.000	4.122	-12.000	4.122	-12.000	4.122	6.00
-10.000	4.140	-10.000	4.140	-10.000	4.140	7.00
-8.000	4.156	-8.000	4.156	-8.000	4.156	8.00
-6.000	4.172	-6.000	4.172	-6.000	4.172	9.00
-4.000	4.188	-4.000	4.188	-4.000	4.188	10.00
-2.000	4.204	-2.000	4.204	-2.000	4.204	11.00
0.000	4.220	0.000	4.220	0.000	4.220	12.00
2.000	4.236	2.000	4.236	2.000	4.236	13.00
4.000	4.252	4.000	4.252	4.000	4.252	14.00
6.000	4.268	6.000	4.268	6.000	4.268	15.00
8.000	4.284	8.000	4.284	8.000	4.284	16.00
10.000	4.300	10.000	4.300	10.000	4.300	1.00
12.000	4.316	12.000	4.316	12.000	4.316	2.00
14.000	4.332	14.000	4.332	14.000	4.332	3.00
16.000	4.348	16.000	4.348	16.000	4.348	4.00
18.000	4.364	18.000	4.364	18.000	4.364	5.00
20.000	4.380	20.000	4.380	20.000	4.380	6.00
22.000	4.396	22.000	4.396	22.000	4.396	7.00
24.000	4.412	24.000	4.412	24.000	4.412	8.00
26.000	4.428	26.000	4.428	26.000	4.428	9.00
28.000	4.444	28.000	4.444	28.000	4.444	10.00
30.000	4.460	30.000	4.460	30.000	4.460	11.00
32.000	4.476	32.000	4.476	32.000	4.476	12.00
34.000	4.492	34.000	4.492	34.000	4.492	13.00
36.000	4.508	36.000	4.508	36.000	4.508	14.00
38.000	4.524	38.000	4.524	38.000	4.524	15.00
40.000	4.540	40.000	4.540	40.000	4.540	16.00
42.000	4.556	42.000	4.556	42.000	4.556	1.00
44.000	4.572	44.000	4.572	44.000	4.572	2.00
46.000	4.588	46.000	4.588	46.000	4.588	3.00
48.000	4.604	48.000	4.604	48.000	4.604	4.00
50.000	4.620	50.000	4.620	50.000	4.620	5.00
52.000	4.636	52.000	4.636	52.000	4.636	6.00
54.000	4.652	54.000	4.652	54.000	4.652	7.00
56.000	4.668	56.000	4.668	56.000	4.668	8.00
58.000	4.684	58.000	4.684	58.000	4.684	9.00
60.000	4.700	60.000	4.700	60.000	4.700	10.00
62.000	4.716	62.000	4.716	62.000	4.716	11.00
64.000	4.732	64.000	4.732	64.000	4.732	12.00
66.000	4.748	66.000	4.748	66.000	4.748	13.00
68.000	4.764	68.000	4.764	68.000	4.764	14.00
70.000	4.780	70.000	4.780	70.000	4.780	15.00
72.000	4.796	72.000	4.796	72.000	4.796	16.00
74.000	4.812	74.000	4.812	74.000	4.812	1.00
76.000	4.828	76.000	4.828	76.000	4.828	2.00
78.000	4.844	78.000	4.844	78.000	4.844	3.00
80.000	4.860	80.000	4.860	80.000	4.860	4.00
82.000	4.876	82.000	4.876	82.000	4.876	5.00
84.000	4.892	84.000	4.892	84.000	4.892	6.00
86.000	4.908	86.000	4.908	86.000	4.908	7.00
88.000	4.924	88.000	4.924	88.000	4.924	8.00
90.000	4.940	90.000	4.940	90.000	4.940	9.00
92.000	4.956	92.000	4.956	92.000	4.956	10.00
94.000	4.972	94.000	4.972	94.000	4.972	11.00
96.000	4.988	96.000	4.988	96.000	4.988	12.00
98.000	5.004	98.000	5.004	98.000	5.004	13.00
100.000	5.020	100.000	5.020	100.000	5.020	14.00
102.000	5.036	102.000	5.036	102.000	5.036	15.00
104.000	5.052	104.000	5.052	104.000	5.052	16.00
106.000	5.068	106.000	5.068	106.000	5.068	1.00
108.000	5.084	108.000	5.084	108.000	5.084	2.00
110.000	5.100	110.000	5.100	110.000	5.100	3.00
112.000	5.116	112.000	5.116	112.000	5.116	4.00
114.000	5.132	114.000	5.132	114.000	5.132	5.00
116.000	5.148	116.000	5.148	116.000	5.148	6.00
118.000	5.164	118.000	5.164	118.000	5.164	7.00
120.000	5.180	120.000	5.180	120.000	5.180	8.00
122.000	5.196	122.000	5.196	122.000	5.196	9.00
124.000	5.212	124.000	5.212	124.000	5.212	10.00
126.000	5.228	126.000	5.228	126.000	5.228	11.00
128.000	5.244	128.000	5.244	128.000	5.244	12.00
130.000	5.260	130.000	5.260	130.000	5.260	13.00
132.000	5.276	132.000	5.276	132.000	5.276	14.00
134.000	5.292	134.000	5.292	134.000	5.292	15.00
136.000	5.308	136.000	5.308	136.000	5.308	16.00
138.000	5.324	138.000	5.324	138.000	5.324	1.00
140.000	5.340	140.000	5.340	140.000	5.340	2.00
142.000	5.356	142.000	5.356	142.000	5.356	3.00
144.000	5.372	144.000	5.372	144.000	5.372	4.00
146.000	5.388	146.000	5.388	146.000	5.388	5.00
148.000	5.404	148.000	5.404	148.000	5.404	6.00
150.000	5.420	150.000	5.420	150.000	5.420	7.00
152.000	5.436	152.000	5.436	152.000	5.436	8.00
154.000	5.452	154.000	5.452	154.000	5.452	9.00
156.000	5.468	156.000	5.468	156.000	5.468	10.00
158.000	5.484	158.000	5.484	158.000	5.484	11.00
160.000	5.500	160.000	5.500	160.000	5.500	12.00
162.000	5.516	162.000	5.516	162.000	5.516	13.00
164.000	5.532	164.000	5.532	164.000	5.532	14.00
166.000	5.548	166.000	5.548	166.000	5.548	15.00
168.000	5.564	168.000	5.564	168.000	5.564	16.00
170.000	5.580	170.000	5.580	170.000	5.580	1.00
172.000	5.596	172.000	5.596	172.000	5.596	2.00
174.000	5.612	174.000	5.612	174.000	5.612	3.00
176.000	5.628	176.000	5.628	176.000	5.628	4.00
178.000	5.644	178.000	5.644	178.000	5.644	5.00
180.000	5.660	180.000	5.660	180.000	5.660	6.00
182.000	5.676	182.000	5.676	182.000	5.676	7.00
184.000	5.692	184.000	5.692	184.000	5.692	8.00
186.000	5.708	186.000	5.708	186.000	5.708	9.00
188.000	5.724	188.000	5.724	188.000	5.724	10.00
190.000	5.740	190.000	5.740	190.000	5.740	11.00
192.000	5.756	192.000	5.756	192.000	5.756	12.00
194.000	5.772	194.000	5.772	194.000	5.772	13.00
196.000	5.788	196.000	5.788	196.000	5.788	14.00
198.000	5.804	198.000	5.804	198.000	5.804	15.00
200.000	5.820	200.000	5.820	200.000	5.820	16.00

OVERALL AVERAGES: TOTAL AVERAGE = 5.000 TOTAL NUMBER OF POINTS = 20.00

TRANSLATION ERROR
TRANSLATION ERROR
TRANSLATION ERROR
END OF JOB