

#405

MARINER 10
INTERPLANETARY EMISSIONS

73-085A-05A

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1. INTRODUCTION:

The documentation for this data set was originally on paper, kept in NSSDC's Data Set Catalogs (DSCs). The paper documentation in the Data Set Catalogs have been made into digital images, and then collected into a single PDF file for each Data Set Catalog. The inventory information in these DSCs is current as of July 1, 2004. This inventory information is now no longer maintained in the DSCs, but is now managed in the inventory part of the NSSDC information system. The information existing in the DSCs is now not needed for locating the data files, but we did not remove that inventory information.

The offline tape datasets have now been migrated from the original magnetic tape to Archival Information Packages (AIP's).

A prior restoration may have been done on data sets, if a requestor of this data set has questions; they should send an inquiry to the request office to see if additional information exists.

2. ERRATA/CHANGE LOG:

NOTE: Changes are made in a text box, and will show up that way when displayed on screen with a PDF reader.

When printing, special settings may be required to make the text box appear on the printed output.

| Version | Date | Person | Page | Description of Change |
|---------|------|--------|------|-----------------------|
| 01 | | | | |
| 02 | | | | |

3 LINKS TO RELEVANT INFORMATION IN THE ONLINE NSSDC INFORMATION SYSTEM:

<http://nssdc.gsfc.nasa.gov/nmc/>

[NOTE: This link will take you to the main page of the NSSDC Master Catalog. There you will be able to perform searches to find additional information]

4. CATALOG MATERIALS:

- a. Associated Documents To find associated documents you will need to know the document ID number and then click here.
<http://nssdcftp.gsfc.nasa.gov/miscellaneous/documents/>

- b. Core Catalog Materials

MARINER 10

INTERPLANETARY EMIS H-HE, ON TAPE

73-085A-05A PSPA-00315

THIS DATA SET HAS BEEN RESTORED. IT ORIGINALLY CONTAINED ONE 7-TRACK, 800 BPI TAPE WRITTEN IN BCD. THERE IS ONE RESTORED TAPE WRITTEN IN ASCII. THE DR TAPE IS A 3480 CARTRIDGE AND THE DS TAPE IS 9-TRACK, 6250 BPI. THE TIME SPANS COULD NOT BE VERIFIED. THE ORIGINAL TAPE WAS CREATED ON AN HP2100 COMPUTER AND WAS RESTORED ON AN IBM 9021 COMPUTER. THE DR AND DS NUMBER ALONG WITH THE CORRESPONDING D NUMBER AND TIME SPAN IS AS FOLLOWS:

| DR# | DS# | D# | FILES | TIME SPAN |
|----------|----------|---------|-------|-----------|
| DR005509 | DS005509 | D030415 | 1 | 11/06/73 |
| | | | 2 | 12/07/73 |
| | | | 3 | 12/19/73 |
| | | | 4 | 01/28/74 |

REQ. AGENT
VJP

RAND NO.
RC8202

ACQ. AGENT
RNH

MARINER 10

INTERPLANETARY EMISSIONS

73-085A-05A

This data set catalog consists of 1 Mariner 10 data tape. The tape is 800 BPI, BCD, 7 track and contains 4 files. The tape was created on an HP2100 computer.

The time span is as follows:

| <u>D#</u> | <u>C#</u> | <u>FILE</u> | <u>TIMESPAN</u> |
|-----------|-----------|-------------|-----------------|
| D-30415 | C-19396 | 1 | 11/06/73 |
| | | 2 | 12/07/73 |
| | | 3 | 12/19/73 |
| | | 4 | 1/28/74 |

II. SPACECRAFT ROLL MANEUVER

In order to provide a calibration point for the cruise science instruments on the Mariner 10 spacecraft, several roll calibration maneuvers (RCM's) were performed. The technique was to disable the star tracker which provided roll

stabilization and caused the spacecraft to roll about the spacecraft-sun line. The roll motion modulated the signals due to the interplanetary medium and verified the functioning of the cruise science instruments. The UVS was operated during these maneuvers and measured the intensity variation of the resonance-scattered H Ly- α 1216 Å and He 584 Å emission from the interplanetary gas as the field of view moved over the celestial sphere. Although many calibrations were planned, only four were actually performed because of spacecraft technical problems.

The rolling motion of the spacecraft caused the 0.13 x 3.6 degree field of view of the UVS to move parallel to the long axis through the sky. Since one axis of the scan platform (clock axis) was directed to the sun, and the other axis (cone axis) was perpendicular to it, the roll was similar to a slew in clock at a constant cone angle. This motion resulted in observations of a strip 0.13° in half-width at the preset cone angle and gave an effective resolution of 3.6° in the direction of the motion. The roll rate was about 0.18°/s and our sample period was 0.6 seconds, so the angular motion was about 0.11° per sample. In order to examine the weak emission, the data was summed over 21-second intervals, or 2.3° per sample. Star positions were determined at higher spatial resolutions so that stellar contamination could be removed.

The Cartesian position vectors of the Mariner 10 spacecraft relative to a heliocentric space-fixed coordinate system, earth true orbital of date, are given in Table 1. These orbital positions are shown projected onto a view of the ecliptic plane in Figure 1. The general direction of the flow of the interstellar wind through the planetary system is shown in Figure 1 with the suggestion of gravitational focusing of neutral helium and possible divergence of the hydrogen stream. The shaded areas extending from the spacecraft position indicate the range of observations in cone angle which were acquired on each of the RCM's; they should be understood to be a section of a complete cone generated about the spacecraft-sun axis.

III. DATA ANALYSIS

A standard method of extracting the hydrogen and helium intensities was used for all of the data and was performed automatically. Detectors identical to those for 584 Å and 1216 Å emissions were located at the wavelength positions 304 Å, 430 Å, 740 Å and 869 Å (see Broadfoot *et al.* 1977). The signal recorded from these detectors while viewing the sky was a good measure of the instrument characteristics from the point of view of internal scattering, noise and dark

current; they were used as background control monitor channels. By an examination of continuous data from a three-week period, it was established that the noise level recorded in the 584 Å channel was consistently equal to one-fifth the sum of the signals recorded in these 4 monitor channels. On this basis, the signal to noise ratio in the 584 Å channel was about 5. The signal in the 1216 Å channel was very strong and the background signature could not be detected in that data. The same noise compensation was used for both the hydrogen and helium emissions and gave a hydrogen signal to noise ratio of about 14. The spectrometer efficiency at 584 Å and 1216 Å was such that a 1 Rayleigh (R) emission produced 0.36 and 0.033 photo-electron events per second, respectively. The 21-second sums of the data given here were smoothed with a third order expansion binomial function, 1,4,6,4,1. We estimate a single point statistical error on a 5 R signal of 584 Å emission to be about ±10% (σ) in this smooth data. Similarly, at a signal level of 200 R of 1216 Å emission, the statistical error was about ±5%.

Most of the pertinent observational information^{*} has been included on the figures containing the data, Figures 2 through 5. The observations were made during roll calibration maneuvers on 6 November 1973 (RCM1), 7 December 1973 (RCM3), 19 December 1973 (RCM4) and 28 January 1974 (RCM7). At the top of each plot, the cone angle of the field of view was given with the

*These raw data are available from the National Data Bank in Greenbelt, MARYLAND.

Space Science

Data Bank

'start roll' and 'stop roll' times marked. In most cases the scan platform was moved after each complete roll. At the bottom of each figure, the time was given in spacecraft event time (SCET) for the beginning of the first 42-second data frame. In each plot of the hydrogen intensity, star positions were indicated numbers; the emission sources which correspond to these numbers were given in the tables related to the figures (Tables 2 through 5). The stellar and planetary sources appeared clearly in the long wavelength channels of the instrument as the field of view crossed the sources. The pointing information was not good enough to indicate where the source was with respect to the center of the field of view. We list these sources as a contamination of the interplanetary emission and have indicated the apparent intensity on a scale from 1 to 10 as a guide to the level of contamination.

When the data are examined carefully, the following points are noteworthy. At the beginning of RC1, Figure 2, the spacecraft was referenced to Vega in roll. Subsequently, the roll maneuver was stopped with a Canopus reference. The scan platform was oriented toward the earth at the beginning of the roll; the apparent excess in 1216 Å emission was due to the earth's geocorona, and the appearance of the earth in the two successive rolls was due to the size of the geocoronal envelope around the earth. The high intensity in helium was

caused by the coincidence that the downwind axis of the interstellar wind was near our field of view.

TABLE 2. RCMI CONTAMINATION SOURCES

| <u>IDENTIFICATION</u> (See Fig. 2) | <u>BORESIGHT</u> R.A. | <u>DIRECTION</u> DEC. | <u>RELATIVE</u> <u>INTENSITY</u> | <u>YALE</u> <u>CATALOG</u> | <u>NAME</u> |
|---------------------------------------|--------------------------|--------------------------|-------------------------------------|-------------------------------|--------------------|
| 1 a) | | | 7.9 | | Earth |
| b) | | | 10 ⁺ | | Earth |
| c) | | | 4.3 | | Earth |
| d) | | | 2.1 | | Earth |
| 2 | 290.9 | 39.0 | 2.1 | 7298 | 20 η Lyr |
| 3 a) | 118.6 | -50.0 | 2.5 | 3207 | γ ² Vel |
| b) | 121.8 | -47.6 | 10 ⁺ | 3207 | γ ² Vel |
| c) | 122.8 | -47.4 | 1.0 | 3207 | γ ² Vel |
| 4 | 286.5 | 42.2 | 2.4 | 7258 | |
| 5 | 291.1 | 30.6 | 6.8 | 7372 | 2 Cyg |

TABLE 3. RCM3 CONTAMINATION SOURCES

| <u>IDENTIFICATION</u> (See Fig. 2) | <u>BORESIGHT</u> R.A. | <u>DIRECTION</u> DEC. | <u>RELATIVE</u> <u>INTENSITY</u> | <u>YALE</u> <u>CATALOG</u> | <u>NAME</u> |
|---------------------------------------|--------------------------|--------------------------|-------------------------------------|-------------------------------|-----------------------|
| 1 a) | 339.8 | 10.8 | 5.6 | 8634 | 42 ζ Peg |
| b) | 339.8 | 10.8 | 4.0 | 8634 | 42 ζ Peg |
| 2 a) | 122.5 | -47.2 | 10 ⁺ | 3207 | γ ² Vel |
| b) | 122.5 | -47.2 | 7.9 | 3207 | γ ² Vel |
| c) | 121.0 | -48.3 | 10 | 3207 | γ ² Vel |
| d) | 119.5 | -49.5 | 7.5 | 3207 | γ ² Vel |
| 3 | 349.0 | -9.4 | 3.3 | 8858 | 93 ψ ² Aqr |
| 4 a) | 120.7 | -40.2 | 2.5 | 3165 | ζ Pup |
| b) | 120.7 | -40.2 | 2.1 | 3165 | ζ Pup |
| c) | 120.7 | -40.2 | 2.1 | 3165 | ζ Pup |
| 5 | 318.6 | 47.6 | 4.2 | 8136 | |

TABLE 4. RCM4 CONTAMINATION SOURCES

| <u>IDENTIFICATION</u> (See Fig. 2) | <u>BORESIGHT</u> R.A. | <u>DIRECTION</u> DEC. | <u>RELATIVE</u> <u>INTENSITY</u> | <u>YALE</u> <u>CATALOG</u> | <u>NAME</u> |
|---------------------------------------|--------------------------|--------------------------|-------------------------------------|-------------------------------|-------------|
| 1 a) | 288.4 | 23.4 | 1.1 | 7318 | 2 Vul |
| b) | 288.4 | 23.4 | 0.9 | 7318 | 2 Vul |
| 2 a) | 197.0 | -49.6 | 0.7 | 4942 | ξ^2 Cen |
| b) | 197.0 | -49.6 | 1.5 | 4942 | ξ^2 Cen |
| c) | 197.0 | -49.6 | 1.1 | 4942 | ξ^2 Cen |
| d) | 197.0 | -49.6 | 0.6 | 4942 | ξ^2 Cen |
| e) | 197.0 | -49.6 | 1.5 | 4942 | ξ^2 Cen |
| 3 a) | 198.8 | -59.9 | 6.2 | 5034- 5035 | |
| b) | 198.8 | -59.9 | 3.0 | 5034- 5035 | |
| c) | 198.8 | -59.9 | 3.6 | 5034- 5035 | |
| d) | 198.8 | -59.9 | 4.0 | 5034- 5035 | |
| e) | 198.8 | -59.9 | 10.0 | 5034- 5035 | |

TABLE 5. RCM7 CONTAMINATION SOURCES

| <u>IDENTIFICATION</u> (See Fig. 2) | <u>BORESIGHT</u> R.A. | <u>DIRECTION</u> DEC. | <u>RELATIVE</u> <u>INTENSITY</u> | <u>YALE</u> <u>CATALOG</u> | <u>NAME</u> |
|---------------------------------------|--------------------------|--------------------------|-------------------------------------|-------------------------------|-----------------|
| 1 | 238.5 | -23.8 | 1.2 | 5907 | |
| 2 | 297.4 | 47.6 | 1.5 | 7589 | |
| 3 | 204.7 | -53.5 | 10 ⁺ | 5132 | ϵ Cen |
| 4 | 39.6 | -1.2 | 10.0 | 779 | 82 δ Cet |
| 5 | 130.9 | -59.6 | 2.1 | 3457 | |
| 6 | 159.7 | -56.9 | 1.3 | 4173 | |
| 7 | 101.8 | -37.6 | 1.4 | 2510 | |
| 8 | 95.0 | -29.5 | 1.0 | 2282- 2397 | ζ CMa |
| 9 | 116.7 | -40.2 | 2.6 | 3025- 3026 | |
| 10 | 206.9 | 50.0 | 10 ⁺ | 5191 | 82 η UMa |
| 11 | 101.0 | -36.6 | 1.4 | 2538 | 13 κ CMa |
| 12 | 83.5 | 18.4 | 1.1 | 1858 | 120 Tau |

FIGURES

Figure 1. An ecliptic projection of the Mariner 10 spacecraft trajectory and planet orbits. Orbital positions of the four RCM's are marked. The lines and shading originating at these positions indicate the cross section of the conic scan generated by the roll. Orbital parameters are given in Table 1. The direction of the interstellar wind is illustrated.

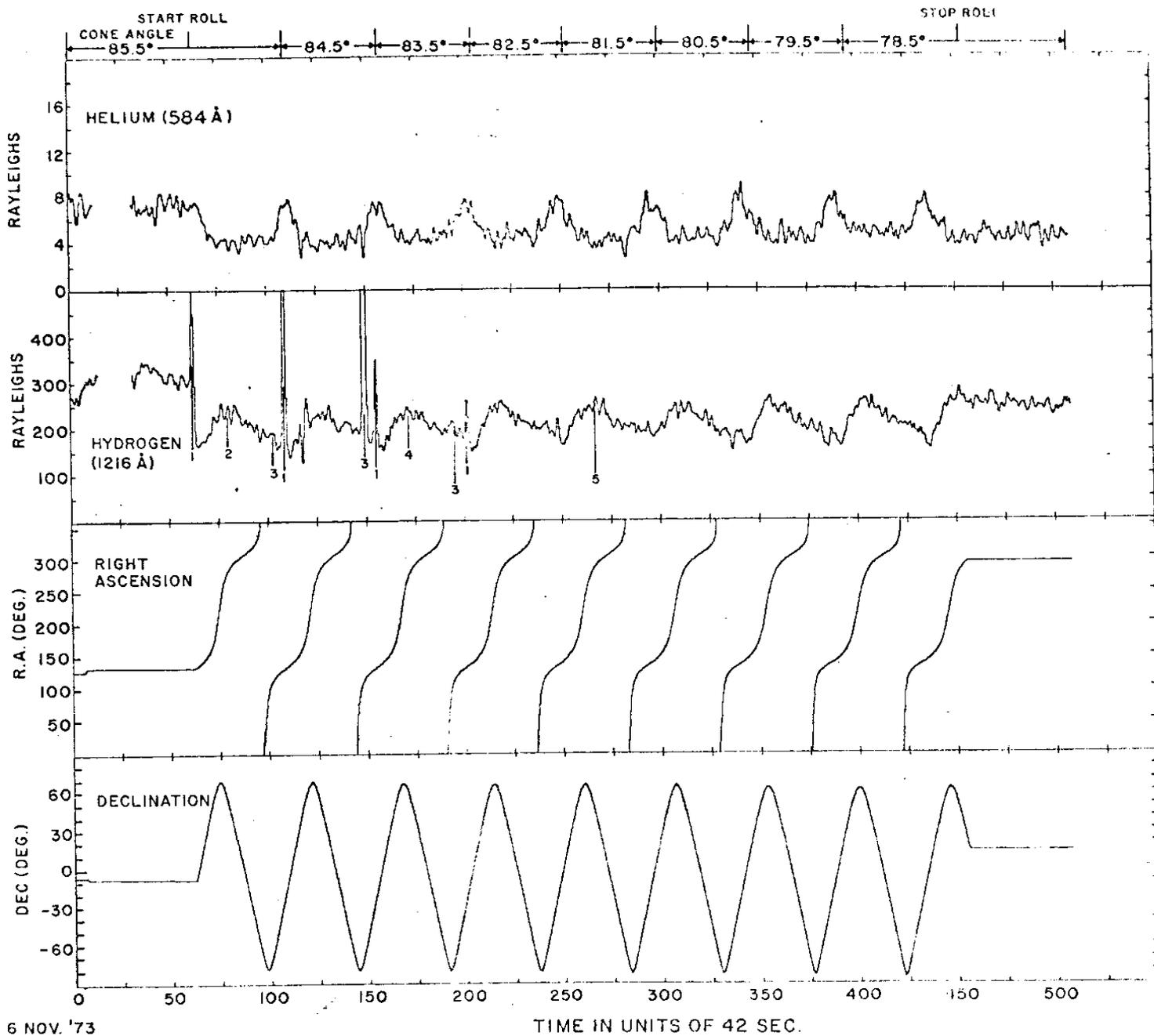
Figure 2. Data from RCM1. The identification of the contaminating point sources (earth and stars), which were numbered in the hydrogen plot, were listed in Table 2.

Figure 3. Data from RCM3. The identification of the contaminating point sources (earth and stars), which were numbered in the hydrogen plot, were listed in Table 3.

Figure 4. Data from RCM4. The identification of the contaminating point sources (earth and stars), which were numbered in the hydrogen plot, were listed in Table 4.

Figure 5. Data from RCM7. The identification of the contaminating point sources (earth and stars), which were numbered in the hydrogen plot, were listed in Table 5.

Figure 6. The ~~boresight~~ track over the celestial sphere of the ultraviolet spectrometer field of view during RCM7.



6 NOV. '73
SCET 22:34:39.6

FIGURE 2

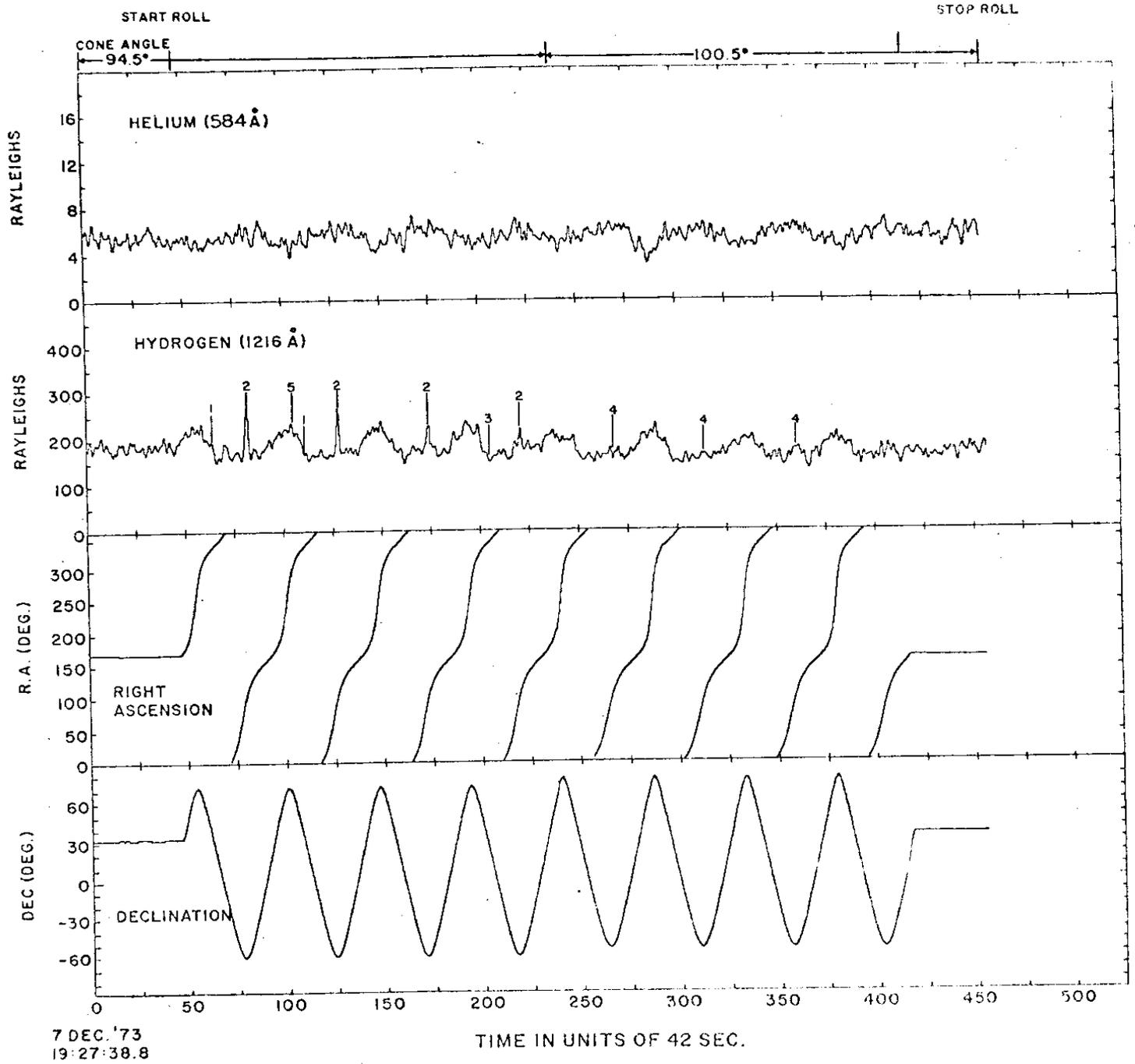
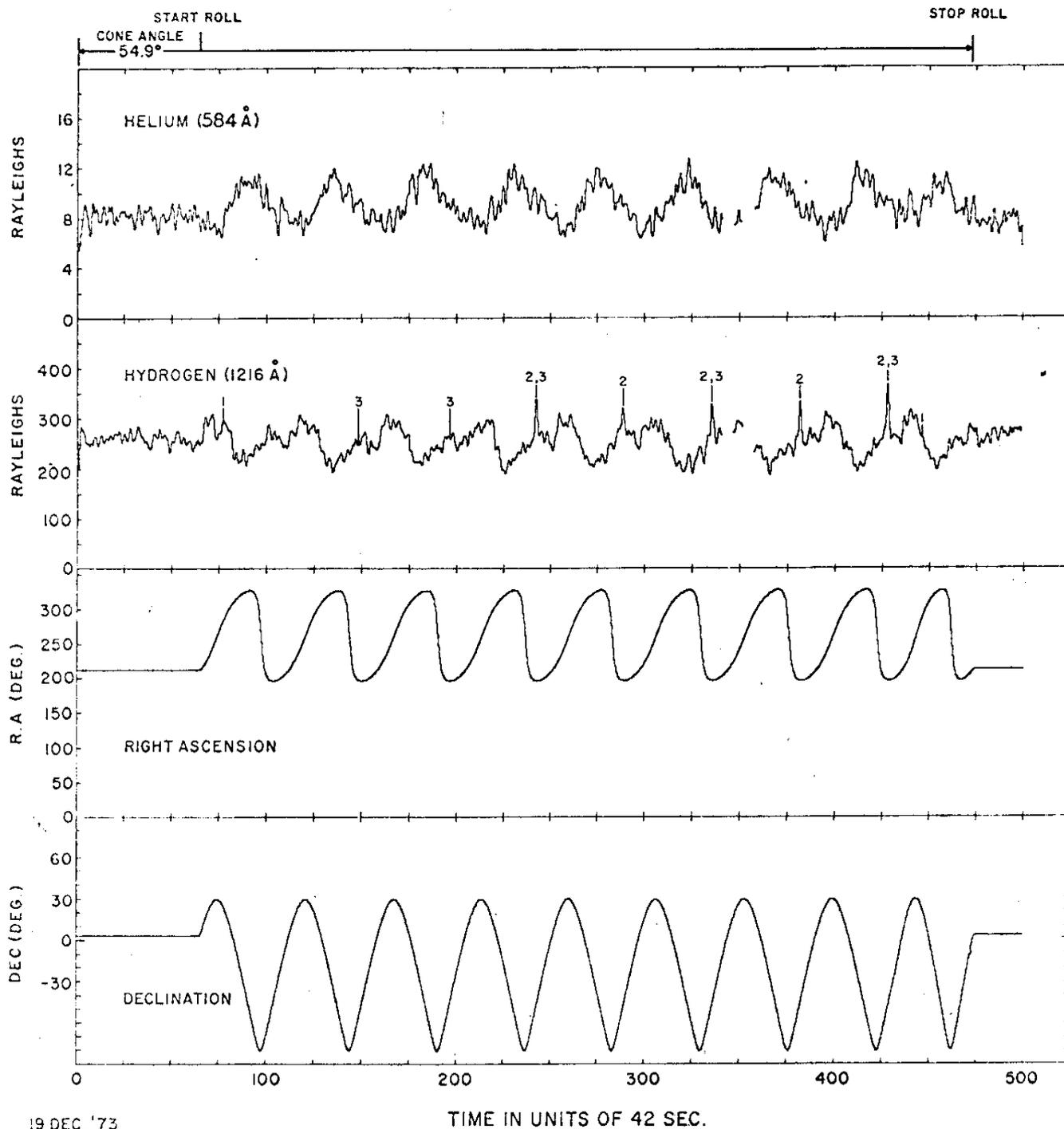


FIGURE 3



19 DEC. '73
SCET 19:14 21.3

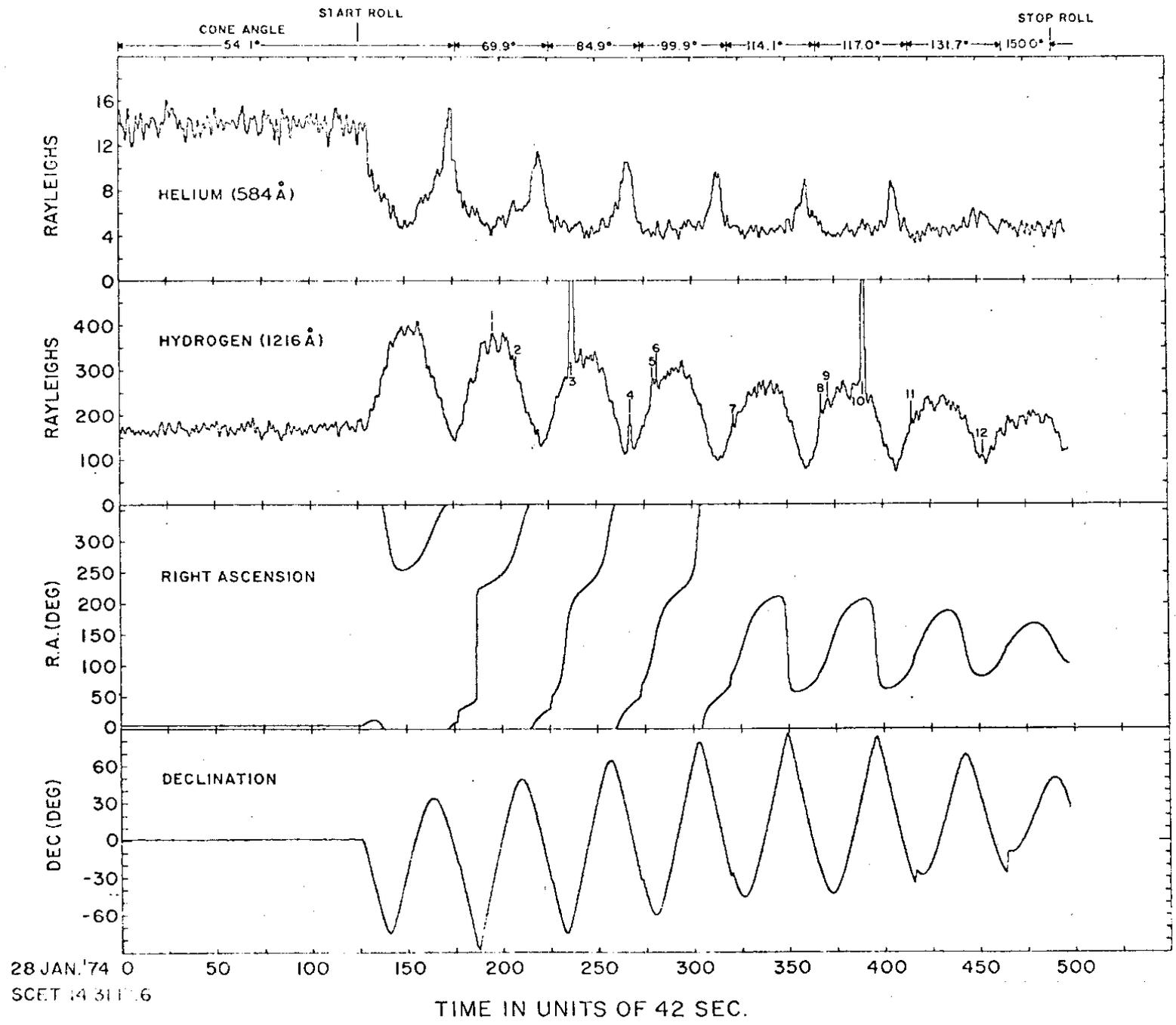


FIGURE 5

PROGRAM BCD, VERSION 1.3 RELEASED: 1 JUNE 1976
HP 2100 VERSION WRITTEN AT MARINER PROGRAMS COMPUTING FACILITY
ASSOCIATION OF UNIVERSITIES FOR RESEARCH IN ASTRONOMY, INC.

File 1

SUBJECT: ROLL CALIBRATION MANEUVER 1 (RCM 1)

START: FDSC = 8101 1973/310 22:34:39.643 (SCET)

STOP: FDSC = 8625

COMPRESSION: 35 (21.0 SEC/SAMPLE)

SPEC CHANNELS OUTPUT TO TAPE: 2 5 9

CH 2 - BACKGROUND PHOTO-ELECTRON EVENTS PER 21 SECONDS
CH 5 - HELIUM PHOTO-ELECTRON EVENTS PER 21 SECONDS
CH 9 - HYDROGEN PHOTO-ELECTRIN EVENTS PER 21 SECONDS

CALIBRATION: 1 RAYLEIGH OF EMISSION YIELDS:

HE (584A): 0.36 PHOTOELECTRON EVENTS/SEC
H (1216A): 0.033 PHOTOELECTRON EVENTS/SEC

GEOM CHANNELS OUTPUT TO TAPE: RA AND DEC

FORMAT OF EACH RECORD ON THE BCD TAPE: 315.1X,2E10.4

TOTAL NUMBER OF RECORDS: 1050.

DATA: 2/17/77 TAPE CREATED BY: DRM

| | | | | |
|----|----|-----|---------------------|-------|
| 12 | 72 | 176 | .1281E+03-.5712E+01 | (1) |
| 11 | 84 | 208 | .1280E+03-.5711E+01 | (2) |
| 13 | 72 | 208 | .1280E+03-.5710E+01 | (3) |
| 14 | 68 | 192 | .1280E+03-.5686E+01 | (4) |
| 16 | 76 | 192 | .1280E+03-.5662E+01 | (5) |
| 12 | 84 | 192 | .1280E+03-.5647E+01 | (6) |
| 9 | 64 | 208 | .1280E+03-.5631E+01 | (7) |
| 11 | 64 | 208 | .1280E+03-.5617E+01 | (8) |
| 15 | 52 | 176 | .1280E+03-.5603E+01 | (9) |
| 12 | 56 | 192 | .1280E+03-.5589E+01 | (10) |
| 14 | 64 | 208 | .1280E+03-.5576E+01 | (11) |
| 11 | 64 | 208 | .1280E+03-.5557E+01 | (12) |
| 11 | 84 | 208 | .1279E+03-.5537E+01 | (13) |
| 9 | 72 | 224 | .1309E+03-.6380E+01 | (14) |
| 12 | 76 | 208 | .1339E+03-.7222E+01 | (15) |
| 16 | 80 | 224 | .1339E+03-.7210E+01 | (16) |
| 14 | 72 | 240 | .1339E+03-.7199E+01 | (17) |
| 18 | 56 | 224 | .1340E+03-.7186E+01 | (18) |
| 15 | 72 | 224 | .1340E+03-.7174E+01 | (19) |
| 17 | 64 | 224 | .1340E+03-.7161E+01 | (20) |
| 20 | 72 | 256 | .1340E+03-.7148E+01 | (21) |
| 14 | 68 | 224 | .1340E+03-.7134E+01 | (22) |
| 16 | 72 | 224 | .1340E+03-.7121E+01 | (23) |
| 16 | 68 | 224 | .1340E+03-.7107E+01 | (24) |
| 15 | 80 | 224 | .1340E+03-.7093E+01 | (25) |
| 13 | 64 | 224 | .1341E+03-.7084E+01 | (26) |
| 11 | 64 | 224 | .1341E+03-.7076E+01 | (27) |
| 14 | 60 | 256 | .1341E+03-.7059E+01 | (28) |
| 12 | 72 | 240 | .1341E+03-.7043E+01 | (29) |
| 9 | 36 | 160 | .1341E+03-.7025E+01 | (30) |
| 0 | 0 | 0 | .1341E+03-.7008E+01 | (31) |
| 0 | 0 | 0 | .1341E+03-.6988E+01 | (32) |
| 0 | 0 | 0 | .1341E+03-.6969E+01 | (33) |
| 0 | 0 | 0 | .1341E+03-.6956E+01 | (34) |
| 0 | 0 | 0 | .1341E+03-.6944E+01 | (35) |
| 0 | 0 | 0 | .1341E+03-.6952E+01 | (36) |
| 0 | 0 | 0 | .1341E+03-.6961E+01 | (37) |
| 0 | 0 | 0 | .1341E+03-.6969E+01 | (38) |
| 0 | 0 | 0 | .1342E+03-.6978E+01 | (39) |
| 0 | 0 | 0 | .1342E+03-.6986E+01 | (40) |
| 0 | 0 | 0 | .1342E+03-.6995E+01 | (41) |
| 0 | 0 | 0 | .1342E+03-.7003E+01 | (42) |
| 0 | 0 | 0 | .1342E+03-.7012E+01 | (43) |
| 0 | 0 | 0 | .1342E+03-.7020E+01 | (44) |
| 0 | 0 | 0 | .1342E+03-.7028E+01 | (45) |
| 0 | 0 | 0 | .1341E+03-.7037E+01 | (46) |
| 0 | 0 | 0 | .1341E+03-.7045E+01 | (47) |
| 0 | 0 | 0 | .1341E+03-.7053E+01 | (48) |
| 0 | 0 | 0 | .1341E+03-.7061E+01 | (49) |
| 0 | 0 | 0 | .1341E+03-.7069E+01 | (50) |
| 0 | 0 | 0 | .1341E+03-.7078E+01 | (51) |
| 0 | 0 | 0 | .1341E+03-.7086E+01 | (52) |
| 0 | 0 | 0 | .1341E+03-.7094E+01 | (53) |
| 0 | 0 | 0 | .1341E+03-.7102E+01 | (54) |
| 0 | 0 | 0 | .1341E+03-.7109E+01 | (55) |
| 0 | 0 | 0 | .1341E+03-.7117E+01 | (56) |
| 0 | 0 | 0 | .1341E+03-.7125E+01 | (57) |
| 0 | 0 | 0 | .1341E+03-.7133E+01 | (58) |
| 0 | 0 | 0 | .1341E+03-.7141E+01 | (59) |
| 0 | 0 | 0 | .1341E+03-.7148E+01 | (60) |
| 0 | 0 | 0 | .1341E+03-.7156E+01 | (61) |
| 9 | 24 | 96 | .1341E+03-.7164E+01 | (62) |
| 23 | 80 | 288 | .1341E+03-.7171E+01 | (63) |

\$JOB 8:46:15
\$ASS IN MS6
\$NOP ***** LIST OF X-410 *****
\$EXEC LIST BS

D-30710
11/6/73 - 1/28/74

INPUT PARAMETERS ARE: BC FL=10=10 4

TAPE NO. 1 FILE NO. 1
RECORD 1 LENGTH 36
12 72 176' .1281E+03-.5712E+01

TAPE NO. 1 FILE NO. 1
RECORD 2 LENGTH 36
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TAPE NO. 1 FILE NO. 1
RECORD 3 LENGTH 36
13 72 2081 .1280E+03-.5710E+01

TAPE NO. 1 FILE NO. 1
RECORD 4 LENGTH 36
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TAPE NO. 1 FILE NO. 1
RECORD 5 LENGTH 36
16 76 1926 .1280E+03-.5662E+01

TAPE NO. 1 FILE NO. 1
RECORD 6 LENGTH 36
12 84 1922 .1280E+03-.5647E+01

TAPE NO. 1 FILE NO. 1
RECORD 7 LENGTH 36
9 64 2087 .1280E+03-.5631E+01

TAPE NO. 1 FILE NO. 1
RECORD 8 LENGTH 36
11 64 2081 .1280E+03-.5617E+01

TAPE NO. 1 FILE NO. 1
RECORD 9 LENGTH 36
15 52 1767 .1280E+03-.5603E+01

TAPE NO. 1 FILE NO. 1
RECORD 10 LENGTH 36
12 56 1923 .1280E+03-.5589E+01

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RECORD 1.43 LENGTH 36
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TAPE NO. 1 FILE NO. 1

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RECORD 1047 LENGTH 36
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TAPE NO. 1 FILE NO. 1
RECORD 1048 LENGTH 36
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RECORD 1049 LENGTH 36
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RECORD 1050 LENGTH 36
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RECORD 2 LENGTH 36
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TAPE NO. 1 FILE NO. 2
RECORD 3 LENGTH 36
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TAPE NO. 1 FILE NO. 2
RECORD 4 LENGTH 36
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TAPE NO. 1 FILE NO. 2
RECORD 5 LENGTH 36
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TAPE NO. 1 FILE NO. 2
RECORD 6 LENGTH 36
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TAPE NO. 1 FILE NO. 2
RECORD 7 LENGTH 36
13 48 1288 .1689E+03 .3037E+02

TAPE NO. 1 FILE NO. 2
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TAPE NO. 1 FILE NO. 2
RECORD 9 LENGTH 36
16 60 1606 .1689E+03 .3035E+02

TAPE NO. 1 FILE NO. 2
RECORD 10 LENGTH 36
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TAPE NO. 1 FILE NO. 2
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RECORD 972 LENGTH 36
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TAPE NO. 1 FILE NO. 2
RECORD 975 LENGTH 36
5 44 1284 .1623E+03 .3336E+02

TAPE NO. 1 FILE NO. 2
RECORD 976 LENGTH 36
7 44 1286 .1623E+03 .3337E+02

TAPE NO. 1 FILE NO. 2
RECORD 977 LENGTH 36
7 44 1127 .1623E+03 .3338E+02

TAPE NO. 1 FILE NO. 2
RECORD 978 LENGTH 36
7 32 968 .1623E+03 .3339E+02

TAPE NO. 1 FILE NO. 3
RECORD 1 LENGTH 36
33 76 1289 .2093E+03 .6040E+01

TAPE NO. 1 FILE NO. 3
RECORD 2 LENGTH 36
26 68 1440 .2093E+03 .6040E+01

TAPE NO. 1 FILE NO. 3
RECORD 3 LENGTH 36
29 68 2240 .2093E+03 .6040E+01

TAPE NO. 1 FILE NO. 3
RECORD 4 LENGTH 36
33 84 2240 .2093E+03 .6040E+01

TAPE NO. 1 FILE NO. 3
RECORD 5 LENGTH 36
32 100 2400 .2093E+03 .6040E+01

TAPE NO. 1 FILE NO. 3
RECORD 6 LENGTH 36
35 80 2240 .2093E+03 .6040E+01

TAPE NO. 1 FILE NO. 3
RECORD 7 LENGTH 36
30 108 2240 .2093E+03 .6040E+01

TAPE NO. 1 FILE NO. 3

35 108 2240 .2093E+03 .6040E+01

TAPE NO. 1 FILE NO. 3
RECORD 9 LENGTH 36
31 100 2240 .2093E+03 .6040E+01

TAPE NO. 1 FILE NO. 3
RECORD 10 LENGTH 36
34 100 2080 .2092E+03 .6009E+01

TAPE NO. 1 FILE NO. 3
RECORD 991 LENGTH 36
36 100 2407 .2139E+03 .2969E+01

TAPE NO. 1 FILE NO. 3
RECORD 992 LENGTH 36
35 84 2249 .2139E+03 .3002E+01

TAPE NO. 1 FILE NO. 3
RECORD 993 LENGTH 36
35 104 2242 .2139E+03 .3035E+01

TAPE NO. 1 FILE NO. 3
RECORD 994 LENGTH 36
36 104 2405 .2139E+03 .3069E+01

TAPE NO. 1 FILE NO. 3
RECORD 995 LENGTH 36
38 100 2249 .2140E+03 .3102E+01

TAPE NO. 1 FILE NO. 3
RECORD 996 LENGTH 36
45 100 2242 .2140E+03 .3136E+01

TAPE NO. 1 FILE NO. 3
RECORD 997 LENGTH 36
39 84 2406 .2140E+03 .3170E+01

TAPE NO. 1 FILE NO. 3
RECORD 998 LENGTH 36
35 88 2400 .2140E+03 .3204E+01

TAPE NO. 1 FILE NO. 3
RECORD 999 LENGTH 36
39 100 2084 .2140E+03 .3239E+01

TAPE NO. 1 FILE NO. 3
RECORD 1000 LENGTH 36
36 104 2409 .2140E+03 .3274E+01

TAPE NO. 1 FILE NO. 4
RECORD 1 LENGTH 36
11 108 1124 .6021E+01 .7403E+00

TAPE NO. 1 FILE NO. 4
RECORD 2 LENGTH 36
7 128 963 .6023E+01 .7296E+00

TAPE NO. 1 FILE NO. 4
RECORD 3 LENGTH 36
7 128 1606 .6026E+01 .7188E+00

TAPE NO. 1 FILE NO. 4
RECORD 4 LENGTH 36
8 108 1128 .6025E+01 .7205E+00

TAPE NO. 1 FILE NO. 4
RECORD 5 LENGTH 36
12 112 1445 .6025E+01 .7223E+00

TAPE NO. 1 FILE NO. 4
RECORD 6 LENGTH 36
11 120 1123 .6025E+01 .7216E+00

TAPE NO. 1 FILE NO. 4
RECORD 7 LENGTH 36
8 120 1126 .6025E+01 .7210E+00

TAPE NO. 1 FILE NO. 4
RECORD 8 LENGTH 36
11 92 1440 .6032E+01 .6954E+00

TAPE NO. 1 FILE NO. 4
RECORD 9 LENGTH 36
12 108 1284 .6038E+01 .6697E+00

TAPE NO. 1 FILE NO. 4
RECORD 10 LENGTH 36
8 116 1287 .6042E+01 .6527E+00

TAPE NO. 1 FILE NO. 4
RECORD 1041 LENGTH 36
24 72 2727 .8341E+02-.5707E+01

TAPE NO. 1 FILE NO. 4
RECORD 1042 LENGTH 36
23 80 3207 .8341E+02-.5707E+01

TAPE NO. 1 FILE NO. 4
RECORD 1043 LENGTH 36
25 64 3207 .8341E+02-.5707E+01

TAPE NO. 1 FILE NO. 4
RECORD 1044 LENGTH 36
26 76 3687 .8341E+02-.5707E+01

TAPE NO. 1 FILE NO. 4
RECORD 1045 LENGTH 36
32 80 3847 .8341E+02-.5707E+01

TAPE NO. 1 FILE NO. 4
RECORD 1046 LENGTH 36
28 60 3847 .8341E+02-.5707E+01

TAPE NO. 1 FILE NO. 4
RECORD 1047 LENGTH 36
43 76 5447 .8341E+02-.5707E+01

TAPE NO. 1 FILE NO. 4
RECORD 1048 LENGTH 36
44 76 5447 .8341E+02-.5707E+01

TAPE NO. 1 FILE NO. 4
RECORD 1049 LENGTH 36
36 88 4967 .8341E+02-.5707E+01

TAPE NO. 1 FILE NO. 4
RECORD 1050 LENGTH 36
38 88 5447 .8341E+02-.5707E+01

*****JOB DONE.