

#388

PIONEER 11

CHARGED PARTICLE

PULSE HEIGHT ANALYSIS + 5 MIN. AVG. COUNT

73-019A-02A + 73-019A-02B

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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 This inventory information is now no longer maintained in the DSCs, but is now managed in the inventory part of the NSSDC information system.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

PIONEER 11

15-MIN PULSE HEIGHT TAPES

73-019A-02A PSFP-00079

THIS DATA SET HAS BEEN RESTORED. THERE WERE ORIGINALLY 59 TAPES, 34 WERE 7-TRACK, 800 BPI, 14 WERE 9-TRACK, 1600 BPI, AND 11 WERE 9-TRACK , 6250 BPI TAPES, WRITTEN IN BINARY. THERE ARE 14 RESTORED TAPES. THE TAPES D079803, D078986-87 ARE MISSING AND REPLACEMENTS HAVE BEEN ORDERED. THE DR TAPES ARE 3480 CARTRIDGES AND THE DS TAPES ARE 9-TRACK, 6250 BPI. THE ORIGINAL TAPES WERE CREATED ON AN IBM XDS COMPUTER AND WERE RESTORED ON AN IBM 9021 COMPUTER. THE DR AND DS NUMBERS ALONG WITH THE CORRESPONDING D NUMBERS AND TIME SPANS ARE AS FOLLOWS:

DR#	DS#	DD#	FILES	TIME SPAN
DR002817	DS002817	D028791	1	04/07/73 - 04/25/73
		D028789	2	04/27/73 - 05/17/73
		D028790	3	05/18/73 - 06/06/73
		D028787	4	06/07/73 - 06/13/73
		D028788	5	06/14/73 - 06/23/73
		D028784	6	06/24/73 - 07/13/73
		D028785	7	07/14/73 - 08/01/73
DR002818	DS002818	D028786	1	08/02/73 - 08/24/73
		D028782	2	08/25/73 - 12/19/73
		D028783	3	09/11/73 - 09/29/73
		D028780	4	09/30/73 - 11/02/73
		D028781	5	11/03/73 - 12/18/73
		D031065	6	12/18/73 - 02/13/74
DR002819	DS002819	D028779	1	12/19/73 - 02/14/74
		D031073	2	02/14/74 - 04/18/74
		D031074	3	04/19/74 - 06/03/74
		D031075	4	06/04/74 - 06/13/74
		D031076	5	06/14/74 - 07/24/74

73-019A-02A

DR#	DS#	DD#	FILES	TIME SPAN
DR002820	DS002820	D031067	1	07/25/74 - 08/13/74
		D031077	2	08/14/74 - 09/11/74
		D031078	3	09/22/74 - 09/28/74
		D031070	4	09/29/74 - 11/05/74
		D031071	5	10/24/74 - 11/05/74
DR002849	DS002849	D031072	1	11/06/74 - 11/19/74
		D031068	2	11/20/74 - 12/02/74
		D031066	3	12/03/74 - 12/10/74
		D031069	4	12/11/74 - 12/31/74
		D031870	5	01/01/75 - 03/04/75
DR002850	DS002850	D031871	1	03/05/75 - 05/21/75
		D031872	2	05/25/75 - 07/04/75
		D031873	3	07/05/75 - 08/21/75
		D031874	4	08/22/75 - 10/25/75
		D031875	5	10/26/75 - 12/22/75
DR002851	DS002851	D031876	1	12/23/75 - 12/31/75
		D047657	2	12/23/75 - 08/06/76
		D047658	3	08/07/76 - 12/31/76
		D053832	4	01/01/77 - 04/16/77
DR002852	DS002852	D053833	1	04/16/77 - 08/29/77
		D053834	2	08/29/77 - 12/31/77
		D053835	3	01/01/78 - 06/26/78
DR002853	DS002853	D053836	1	06/27/78 - 12/31/78
		D053837	2	01/01/79 - 06/17/79
		D053838	3	06/18/79 - 08/12/79
DR002854	DS002854	D053839	1	08/12/79 - 10/01/79
		D053840	2	10/02/79 - 12/31/79
		D076253	3	01/01/85 - 12/31/85
DR002855	DS002855	D058739	1	01/01/80 - 05/19/80
		D058740	2	05/20/80 - 10/13/80
		D058741	3	10/14/80 - 12/31/80
DR002856	DS002856	D074061	1	01/02/84 - 12/31/84
DR002861	DS002861	D073388	1	01/02/81 - 01/01/82
DR006046	DS006046	D082581	1	01/02/89 - 12/30/89
		D086240	2	01/02/90 - 12/30/90
		D100505	3	01/01/91 - 01/01/92
		D107838	4	06/03/92 - 11/29/92
		D107839	5	01/02/93 - 01/01/94

PIONEER 11

5-MIN. SECTORED COUNT RATES TAPE

73-019A-02B PSFP-00106

THIS DATA SET HAS BEEN RESTORED. THERE WERE ORIGINALLY 32 TAPES, 12 WERE 7-TRACK 800 BPI, 10 WERE 9-TRACK 1600 BPI, AND 10 WERE 9-TRACK 6250 BPI TAPES, ALL WERE WRITTEN IN BINARY. THERE ARE 15 RESTORED TAPES. THE DR TAPES ARE 3480 CARTRIDGES AND THE DS TAPES ARE 9-TRACK, 6250 BPI. THE ORIGINAL TAPES WERE CREATED ON A XDS 930 COMPUTER AND THEY WERE RESTORED ON AN IBM 9021 COMPUTER. THE DR AND DS NUMBERS ALONG WITH THE CORRESPONDING D NUMBERS AND TIME SPANS ARE AS FOLLOWS:

DR#	DS#	DD#	FILES	TIME SPAN
DR002759	DS002759	D028797	1	04/07/73 - 07/16/73
		D028798	2	07/17/73 - 09/10/73
		D028799	3	09/11/73 - 12/09/73
		D031060	4	12/09/73 - 04/06/74
		D028800	5	12/10/73 - 04/07/74
		D031064	6	04/07/74 - 06/13/74
DR002760	DS002760	D031063	1	06/14/74 - 09/06/74
		D031062	2	09/07/74 - 10/23/74
		D031061	3	10/23/74 - 12/31/74
		D031867	4	01/09/75 - 05/05/75
		D031868	5	05/06/75 - 08/21/75
		D031869	6	08/22/75 - 12/31/75
DR002761	DS002761	D047659	1	08/22/75 - 09/27/76
		D047660	2	09/28/76 - 06/07/77
		D053841	3	06/07/77 - 12/31/77
DR002762	DS002762	D053842	1	01/01/78 - 06/26/78
		D053843	2	06/27/78 - 12/31/78
		D053844	3	01/03/79 - 08/12/79
DR002763	DS002763	D053845	1	08/12/79 - 12/31/79
		D058742	2	01/01/80 - 10/13/80
		D058743	3	10/14/80 - 12/31/80

73-019A-02B

DR#	DS#	D#	FILES	TIME SPAN
-----	-----	-----	-----	-----
DR002764	DS002764	D073389	1	01/01/81 - 12/31/81
DR002765	DS002765	D074062	1	01/02/84 - 12/31/84
DR002766	DS002766	D076254	1	01/01/85 - 12/31/85
DR002767	DS002767	D078988	1	01/01/86 - 12/31/86
DR002768	DS002768	D078989	1	01/01/84 - 06/30/84
DR002769	DS002769	D079804	1	07/01/84 - 12/31/84
DR003963	DS003963	D082582	1	01/01/89 - 12/27/89
		D086241	2	12/31/89 - 12/30/90
DR004499	DS004499	D100506	1	01/03/91 - 10/31/91
DR006043	DS ⁴ 006043	D107840	1	06/04/92 - 11/29/92
DR006044	DS006044	D107841	1	01/01/93 - 12/30/93
		D108255	2	01/01/94 - 12/11/94

REQ. AGENTCMT
PAR
WKD
DEW
DHGRAND NO.

RC2742

RC7196

ACQ. AGENT

JHK

DVR

NJS

PIONEER 11

CHARGED PARTICLE PULSE HEIGHT ANALYSIS & 5 MIN. AVG. COUNT RATES

73-019A-02A & 73-019A-02B

This data set consists of 50 Pulse Height Analysis (02A) and 23 5 Minute Avg. Count Rate (02B) data tapes. The tapes, unless specified otherwise, are 7 track, 800 bpi, binary, single-filed. They were created at the University of Chicago on an XDS 930 computer.

The Pulse Height tapes contain data records between 150 and 1020 (24 bit) words long and header records of 120 words for every 15 minutes of real data. The header records are made up of 60 XDS double-precision floating point words. This double-precision word is described on page 138 of the format. The data records are written in fixed point format which is described on Page 137.

The Count Rate tapes contain data records of 480 double-precision floating point words. Each physical record consists of 6 logical records. The 'D' and 'C' numbers and time spans for the tapes are as follows:

PULSE HEIGHT DATA 73-019A-02A

<u>D#</u>	<u>C#</u>	<u>TIME SPAN</u>
D-28787	C-18761	06/07/73 - 06/13/73
D-28788	C-18762	06/14/73 - 06/23/73
D-28784	C-18758	06/24/73 - 07/13/73
D-28785	C-18759	07/14/73 - 08/01/73

PULSE HEIGHT DATA 73-019A-02A (cont')

<u>D#</u>	<u>C#</u>	<u>TIME SPAN</u>
D-28786	C-18760	08/02/73 - 08/24/73
D-28782	C-18756	08/25/73 - 09/09/73
D-28783	C-18757	09/11/73 - 09/29/73
D-28780	C-18754	09/30/73 - 11/02/73
D-28781	C-18755	11/03/73 - 12/18/73
D-31065	C-20520	12/18/73 - 02/13/74
D-28779	C-18753	12/19/73 - 02/14/74
D-31073	C-20527	02/14/74 - 04/18/74
D-31074	C-20528	04/19/74 - 06/03/74
D-31075	C-20529	06/04/74 - 06/13/74
D-31076	C-20530	06/14/74 - 07/24/74
D-31067	C-20522	07/25/74 - 08/13/74
D-31077	C-20531	08/14/74 - 09/11/74
D-31078	C-20532	09/22/74 - 09/28/74
D-31070	C-20524	09/29/74 - 11/05/74
D-31071	C-20525	10/24/74 - 11/05/74
D-31072	C-20526	11/06/74 - 11/19/74
D-31068	C-20523	11/20/74 - 12/02/74
D-31066	C-20521	12/03/74 - 12/10/74
D-31069	C-20538	12/11/74 - 12/31/74
D-31870	C-20507	01/01/75 - 03/04/75
D-31871	C-20508	03/05/75 - 05/21/75
D-31872	C-20509	05/25/75 - 07/04/75
D-31873	C-20510	07/05/75 - 08/21/75
D-31874	C-20511	08/22/75 - 10/25/75

PULSE HEIGHT DATA 73-019A-02A (cont')

<u>D#</u>	<u>C#</u>	<u>TIME SPAN</u>
D-31875	C-20512	10/26/75 - 12/22/75
D-31876	C-20513	12/23/75 - 12/31/75
D-47657*	C-22343*	12/23/75 - 08/06/76
D-47658*	C-22344*	08/07/76 - 12/31/76
D-53832*	C-22865*	01/01/77 - 04/16/77
D-53833*	C-22866*	04/16/77 - 08/29/77
D-53834*	C-22867*	08/29/77 - 12/31/77
D-53835*	C-22868*	01/01/78 - 06/26/78
D-53836*	C-22869*	06/27/78 - 12/31/78
D-53837*	C-22870*	01/01/79 - 06/17/79
D-53838*	C-22871*	06/18/79 - 08/12/79
D-53839*	C-22872*	08/12/79 - 10/01/79
D-53840*	C-22873*	10/02/79 - 12/31/79
D-58739*	C-23210*	01/01/80 - 05/19/80
D-58740*	C-23211*	05/20/80 - 10/13/80
D-58741*	C-23212*	10/14/80 - 12/31/80
D-73388**	C-26771**	01/02/81 - 01/01/82
D-74061**	C-26772**	01/02/84 - 12/31/84
D-76253**	C-26639**	01/01/85 - 12/31/85

*These tapes are 9-track, 1600 bpi

**These tapes are 9-track, 6250 bpi

COUNT RATE DATA 73-019A-02B

<u>D#</u>	<u>C#</u>	<u>TIME SPAN</u>
D-28797	C-18791	04/07/73 - 07/16/73
D-28798	C-18792	07/17/73 - 09/10/73
D-28799	C-18793	09/11/73 - 12/09/73
D-31060	C-20533	12/09/73 - 04/06/74
D-28800	C-18794	12/10/73 - 04/07/74
D-31064	C-20537	04/07/74 - 06/13/74
D-31063	C-20536	06/14/74 - 09/06/74
D-31062	C-20535	09/07/74 - 10/23/74
D-31061	C-20534	10/23/74 - 12/31/74
D-31867	C-20514	01/09/75 - 05/05/75
D-31868	C-20515	05/06/75 - 08/21/75
D-31869	C-20516	08/22/75 - 12/31/75
D-47659*	C-22345*	08/22/75 - 09/27/76
D-47660*	C-22346*	09/28/76 - 06/07/77
D-53841*	C-22874*	06/07/77 - 12/31/77
D-53842*	C-22875*	01/01/78 - 06/26/78
D-53843*	C-22876*	06/27/78 - 12/31/78
D-53844*	C-22877*	01/03/79 - 08/12/79
D-53845*	C-22878*	08/12/79 - 12/31/79
D-58742*	C-23213*	01/01/80 - 10/13/80
D-58743*	C-23214*	10/14/80 - 12/31/80
D-73389**	C-26773**	01/01/81 - 12/31/83
D-74062**	C-26774**	01/02/84 - 12/31/84
D-76254**	C-26640**	01/01/85 - 12/31/85
U 82382	C-21338	1/1/84 - 12/31/84
U 82382	C-29344	12/31/84 - 12/31/84

*These tapes are 9-track, 1600 bpi
 **These tapes are 9-track, 6250 bpi

September 25, 1985

To: The Record

From: Norman Schofield

Subject: Changes in Data Set 73-019A-02A

On September 19, 1985, Gordon Lentz called from the University of Chicago to say that in the future Pioneer 11 Pulse Height Analysis data set (73-019A-02A) tapes will be 6250 BPI and therefore will contain about 2 years of data per tape. And in the future the Euler angles in this data set will be filled with zeros. The next tape shipment received should contain a letter describing these changes and that letter can replace this memo.

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THE ENRICO FERMI INSTITUTE

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AREA CODE 312-962-7839

*Laboratory for Astrophysics
and Space Research*

May 6, 1982

Mr. Ralph Post
National Space Sciences Data Center
Goddard Space Flight Center
Code 601
Greenbelt, Maryland 20771

Dear Ralph:

I have been unable to contact you by phone but, assuming that your message implied you wanted a second copy of the modified, 9-track format for the Pioneer data tape submission, I am enclosing a copy of my letter to you of 23 January 1980 which outlines this format. I hope this is what you need.

Sincerely,

Gordon A. Lentz
Manager, Data Systems and Analysis

GAL:rs
Enclosure

THE UNIVERSITY OF CHICAGO
THE ENRICO FERMI INSTITUTE

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*Laboratory for Astrophysics
and Space Research*

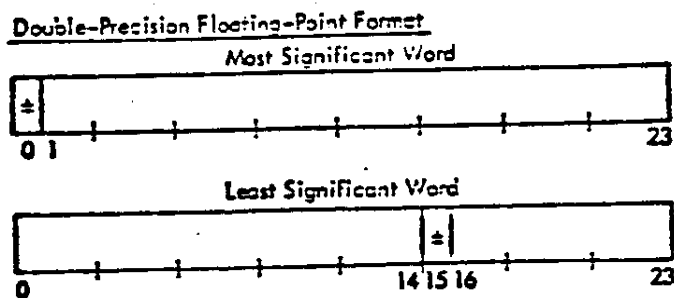
January 23, 1980

Mr. Ralph Post
National Space Sciences Data Center
Goddard Space Flight Center
Code 601
Greenbelt, Maryland 20771

Dear Mr. Post:

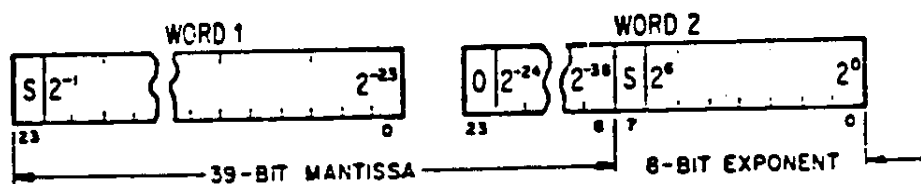
This is to inform you that our next submission of Pioneer 10 and 11 data will be in a different format than the previous submissions have been. The differences are twofold:

1. The tapes will be recorded in 9-track, ⁶²⁵⁰1600 fci mode and
2. While the form of integer data on the tapes is unchanged, the form of a floating point number is different. Both the new and the old format are 48-bit floating point numbers, however, the old floating point format was as follows:



While the new floating point format is:

DOUBLE PRECISION - FLOATING POINT



January 23, 1980

You will notice there are three obvious significant differences between the two formats. First of all, the order of the words has been changed so that the word containing the most significant part of the mantissa will appear in memory in the lower-address word while in the older format it occupied the higher-address word, while secondly, bit 23 of the "exponent" word is unused in the new format and is always 0, while finally, the exponent in the new format is 8 bits instead of 9 bits long. Another thing to be aware of is that a floating point 0 in the new format consists of two words with the exponent containing octal 210 with zeros elsewhere. The old format was all 0. The form of both mantissa and exponent are the same as before (2's complement.) In order to refresh your memory as to the general form of the two data-tape types that we send you I have appended a brief verbal description. I hope that this change does not cause you much extra work; it is really a fairly straightforward change.

Sincerely yours,



Gordon A. Lentz

GAL:rs
Attachment

cc: Mr. Bill Valente - NSSDC
Peter Kruley - UC
Bruce McKibben - UC
John Simpson - UC

Pioneer Rate Tape Format:

1 physical record = 960 (24-bit) words = 6 logical records. Each logical record contains 160 24-bit words, of which words 1 → 6 incl. are integer fmt, and words 7 → 160 inc. are floating point (i.e., 77 48-bit words.)

Pulse Height Tape Format:

Each 15-minute interval is represented by 1 header record followed by 1 or more data records.

A header record consists of 60 48-bit words, all in floating point format.

A data record consists of N 24-bit words, $150 \leq N \leq 1020$. All of these are in integer format.

Header records and data records constitute distinct physical records. In addition to the difference in length, header records can be distinguished from data records by examining the most significant bit of the most significant word. In header records, this bit is set; in data records reset.

7.

Rate tapes ^{8¹⁰ 02C}

year ~~is~~ first 4 digits of octal dump.
 SPacecraft ID is 2nd 4 digits } we }
 Start time word 9 + 10 together (sometimes you must use 2
 a word = 8 octal characters (24 bits) }
 3rd word

Stop time word 11 + 12 (last record) together

Times are in XDS 48 bit Floating point format.
 Use "XDS" program.

Times are in decimal seconds of year.

to get day of year, divide by 86400 ^{8¹⁰ 02C}

Remember that if there is anything after the decimal, add
 1 day. ex 24.531 = day 25. 55 (calc = / on terminal)

* (on the last group of tapes the 1st record didn't work for time spans, so we had to use the 2nd record) *

Pulse Height tapes ^{8¹⁰ 02B} - use program (pulse-height) you must use the header record to find 1st + last date

Start time is word 41 First record (sometimes it word 5)

Stop time is word 5 Last record

Words are 16 octal characters (48 bits)

Words are in XDS 48 bit Floating point format

Times are listed in days since Jan 1, 1972.

(1/1/90 = day 6575)

which means add one day

Use "XDS" Program to translate octal words.

7805
 6575
 230

PULSE HEIGHT

3 Min. Count Rate Tapes

D-28792

Start Time - Words 9+10 of first record

24101630 21754711

Exponent - $30_8 = 24_{10}$

100 011 111 011 001 110 010 010 610

8 3 8 8 6 0 8

7 8 6 4 3 2

2 2 9 3 7 6

1 2 2 8 8

5 1 2

3 8 4

1 6

2

9417618

86400 109
9417618

86400

77761

77600

161

If Jan 1 = Day 0 then Day 109 = Day 110
or 4/20/73

Stop Time - Last Record, Words 9+10

27737030 25056024

52134050₈ = 115 7192₁₀

86400 128
1157192

If Jan. 1 = Day 0 then Day 128 = Day 129

or 5/9/73

II.

PRELIMINARY DOCUMENTATION

University of Chicago Charged Particle Instruments

of

Pioneer 10/11 Spacecraft

Pulse Height Tape Format

72-012A-02B

1 August 1974

GENERAL

This section supplies the minimum format and functional-specifications information to allow the user to read the University of Chicago Pioneer 10/11 Pulse Height tapes. These tapes contain all of the Pulse Height information from the Charged Particle Instrument (CPI) for the missions in a form easily accessible to a FORTRAN-language program. Individual pulse height frames are not time-tagged but are tabulated in blocks corresponding to 15 minutes of real-time at the spacecraft (spacecraft time).. Additional bookkeeping, housekeeping and supporting instrument data are supplied to allow for general use of the pulse height information.

The general tape structure is shown in Figure II-1. All non-zero pulse height frames occurring within the bounds of a 15-minute period of real-time are tabulated as triads of numbers corresponding to the pulse heights measured in the three analyzed detectors of the UC-CPI.⁽¹⁾

The header block supplied at the beginning of each 15-minute block of data contains bookkeeping information (start and stop times of the data, instrument status, seconds of main frame and subcommutated (subcom) data actually received in the 15-minute block), housekeeping data including the initial bit rate, mode and format of the spacecraft during the 15-minute reporting period, and supporting instrument information in the form of selected rate data. The counting rates presented in the data block header records are extracted from the UC-CPI Rate Tapes. See Section IV for a discussion of the design of the logic and of the rate scalers in the instrument, Section III for a description of the basic rate-calculation algorithms and the Appendix, Section V-2 for the method of extracting and averaging the rates for inclusion in the PHA tapes. It is important to note that if a change in spacecraft or instrument mode occurs during a 15-minute recording period, the time block will be prematurely terminated at the time of the mode or status change and one (or more) additional blocks of less than 15 minutes, ending at the predetermined termination point of the original 15 minute block, will be generated with flags set for the changed mode(s).

⁽¹⁾ The detectors D1, D2 and D5 are pulse height analyzed in the UC-CPI. The range of each analysis is 0-128. The triad of pulse heights are accompanied by a range identification flag (ID), a data quality indicator bit and the octant of spacecraft revolution in which the event presented was analyzed. See the UC-CPI Instrument Description and Pioneer 10/11 Spacecraft Description for further details.

One or more data records of variable length containing all of the non-zero pulse height analyzed (PIIA) events occurring during the 15 minute period specified in the previous header then follow.⁽²⁾ Both main telescope (main telescope) and subcommutated (low energy telescope-LET) PIIA data are extracted and reformed into the data blocks. Only LET data with channel numbers between zero and twenty-seven are copied. In-flight calibrator data are excluded from the pulse height tape.

PULSE HEIGHT TAPE HEADER CONTENT

This section describes the content of the header record which precedes that data record(s) containing the data for the 15 minute span of real time. This header record is made up of sixty XDS double-precision floating point (double) words. The description of the floating point format is given as Appendix V-1. It is important to note that the quoted 15 minute intervals are nominal. That is, any 15 minute interval in which there was no appreciable quantity of data lost by transmission, or any significant instrument or spacecraft change will be 15 minutes in length starting within two frame times of the even hour, 15 minutes after the hour, 30 minutes after, etc. Clearly, if the spacecraft transmission was lost in the middle of a nominal 15 minute accumulation period and was not reattained until some number of 15 minute intervals later, the interval during which loss of transmission took place would be truncated at the time of the last recoverable pulse height returned to earth and the next 15 minute interval would show a start time after some lapse of time. The "15 minute" period following a data gap will, of course, start at an arbitrary time within some nominal 15 minute interval. The interval will, however, end at an "even" quarter-hour boundary. Similarly, as described earlier, if a spacecraft or instrument status change takes place in the middle of a nominal 15 minute interval that interval will be terminated prematurely as if a data gap had been encountered and a new header/data block would be supplied beginning at the time that the status change was first noted, with the new status in the header record, and would finish out the nominal 15 minute period started earlier (unless another instrument or spacecraft status change occurs in the same interval in which case the interval would be interrupted, etc.).

Table II-1 described the content of each floating-point word in the header record.

⁽²⁾ A "zero pulse height event" is defined to be an event wherein all three detectors, the ID and the sector are transmitted as zero, i.e. no event was seen within that readout time.

DATA RECORD FORMAT

A variable number of physical records of variable length, containing the pulse height data will be found after each header (Fig. II-1). The number of such records to be found in the data block is indicated in the header record for that data block. The total number of words in each record of the data block is indicated in the second 24-bit word of the data record (Figure II-2). If more than one physical record (say, II) occurs in the data block, the first N-1 such records will have 1020, 24-bit words in them (a 2 word record header and 509 main or LET work pairs containing data). The last record will be of a variable length with a minimum length of 150, 24-bit words and a maximum of 1020. This last record will be padded out with words containing garbage to the nearest multiple of 3, 24-bit words which gives a total record length greater than or equal to 150, 24-bit words. This is done in order to make the tapes compatible with the Univac 1108, 36-bit word record format. It is therefore necessary to use the event count (word 2 of the record) at all times to determine the end-of-logical-record.

The first word of each physical data record contains the number of the physical data record within the current 15-minute data block. The records are numbered starting with 1 after each header. The second word contains the number of data word pairs in the record and will be a number between 1 and 509.

Each pulse height event in the 15 minute interval is presented sequentially in pairs of 24-bit words beginning with the words 3 and 4 of the record. A main telescope word-pair is differentiated from a LET word-pair by bit 0 of the first word of the pair (which is 0 for LET, 1 for the main telescope). The format of the data within the word pair is given in Figure II-3. Table II-2 gives a description of the abbreviations used in Figure II-3.

FIGURES

- Figure II-1. Pulse Height Tape Structure. Each block represents
a physical record,40
- Figure II-2. Pulse Height Tape Data record format41
- Figure II-3. Pulse Height Tape Data Word Content.42
- Figure II-4. Relation of Spacecraft Z-axis and Start of
Sector Zero to the Sun-Probe Line Projected
on the Ecliptic (Euler Angles)43

FIGURE II-1

Pioneer 10

Pulse Height Tape Structure

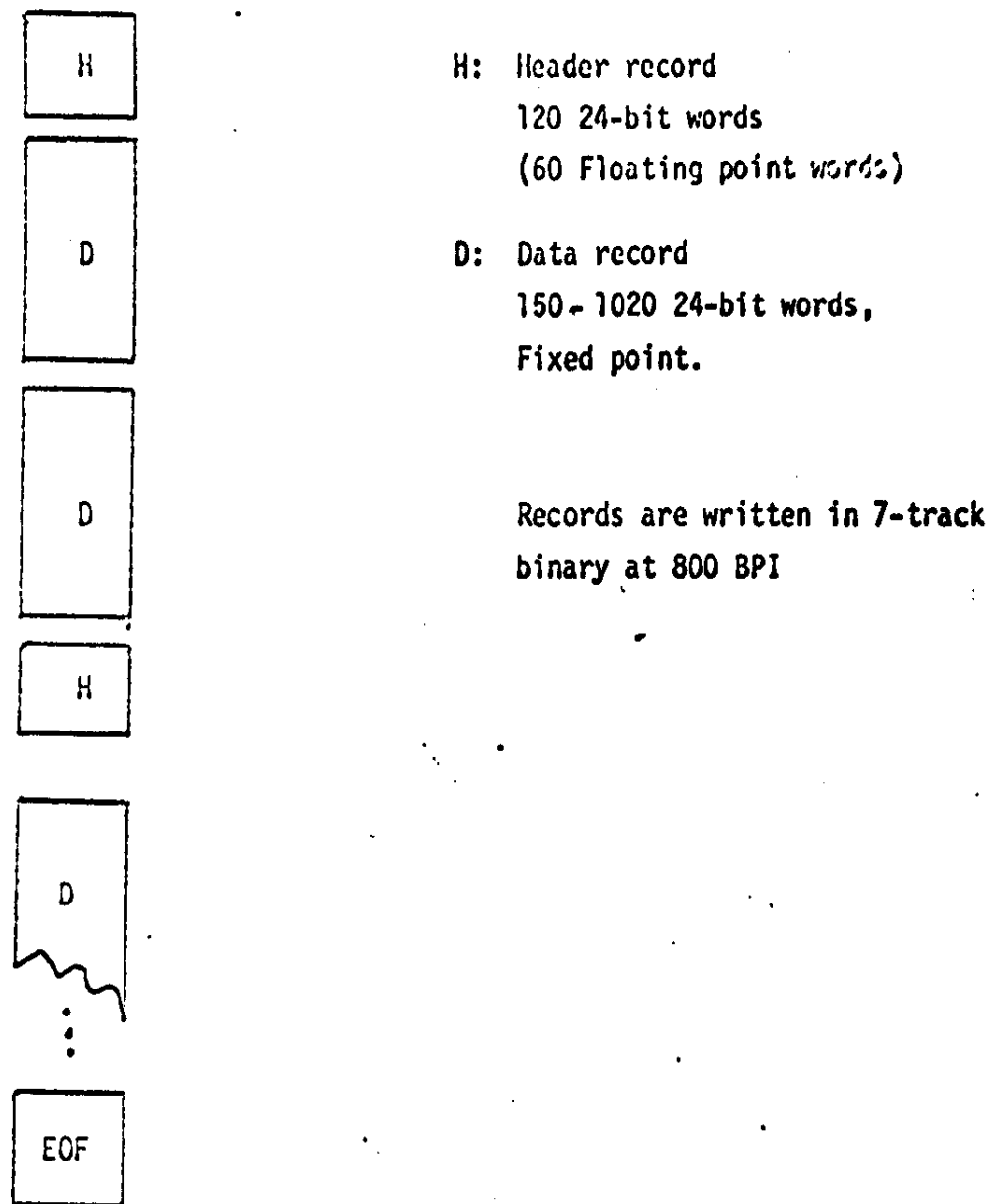


FIGURE II-2

Pioneer 10/11
Pulse Height Tape
Data Record Format

Word 1
2

⋮

N
N+1

ZEROS
ZEROS

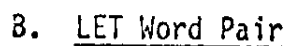
WORD 1 contains the physical record number of the data record in the data block (starting from 1 after the header).

WORD 2 contains the number of word pairs in this record.

Words N, N+1 are the Word Pair.
 $1 \leq N \leq 509$

If the record is not filled with word pairs, the remaining words are filled with garbage (see text).

Pioneer 10/11
Pulse Height Data Word Format*



**The DQI (data quality indicator) does not appear (is always zero) on Pioneer 10 pulse height tapes for 1972 through day 172 of 1973. (See Table II-2.) It does appear on all Pioneer 11 tapes and on all subsequent Pioneer 10 tapes.

Figure II-4

Relation of Spacecraft Z-axis and
Start of Sector Zero to the Sun-Probe
Line Projected on the Ecliptic (Euler Angles)

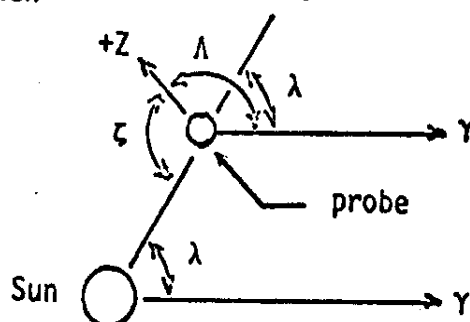
θ Celestial latitude of point on the celestial sphere intersected by +Z axis.

ζ Angle between the +Z axis and the sun-probe line, projected onto an axis parallel to the ecliptic. Computed as follows:

If λ = celestial longitude of probe in heliocentric system (from trajectory tape)

and Λ = celestial longitude of point on the celestial sphere intersected by +Z axis.

then



ω Angle between plane parallel to ecliptic and location of telescope axis at start of sector 0 in spin plane of probe when $SPGR = 0^\circ$ and 180° , respectively, and sun sensor is used. Positive in direction of roll.

$$\omega = \text{MOD}_{360} (CKAH + SPGR - 7.1^\circ)$$

When the star sensor is used, to an accuracy of $\pm 1^\circ$, $\omega = -7^\circ$ at all times.

TABLES

TABLE II-1 University of Chicago Charged Particle Instrument
Pioneer 10/11 Pulse Height Tape Header-Record Format. . .45-47

TABLE II-2 University of Chicago Charged Particle Instrument
Pioneer 10/11 Description of Data Block Word-Pair
Parameters. 48

TABLE II-1

University of Chicago Charged Particle Instrument
Pioneer 10/11
Pulse Height Tape Header-Record Format

HEADER WORD ¹	DESCRIPTION
1	-1
2	Requested (Nominal) interval start time in days and fractions beginning on 1 January 1972 (that is, 0000 on 1 January 1972 = 0.000...).
3	Requested (Nominal) interval end-time in days and fractions of days of 1972.
4	Actual start time in days and fractions of days of 1972.
5	Actual end time in days and fractions of days of 1972.
6	F/T ratio where: F=number of main telescope pulse height main frames with the data quality bit set to 1 (bad data) T=total main frames of pulse height data in the interval.
7	Mode (initial) = 2 for memory readout data = 1 for telemetry store data = 0 for real time data.
8	Initial bit rate. A number from 16-2048 in powers of 2.
9	Bookkeeping bits. This word is constructed as follows: $\text{WORD9} = 512 * S + 256 * \text{SUN} + 128 * \text{STAR} \\ + 64 * E + 32 * D_1 + 16 * D_2 \\ + 8 * D_7 + 4 * P + 2 * U + C$ If any variable in the equation is 0, then the corresponding condition is normal or the associated data is good. If any variable is 1: if S=1, the sectoring data is suspect; if SUN=1, the SUN=A or SUN=B reference source was used; if STAR=1, the STAR reference source was used; if E=1, the select status information was erroneous or missing; if any $D_i=1$ ($i=1,2,3$), then that detector was turned off;

¹Each header word consists of two 24 bit computer words in XDS 930 standard double-precision floating point format. See the Appendix, Section V-1 for a discussion of this word structure.

TABLE II-1, Continued

HEADER WORD	DESCRIPTION
	if P=1, the instrument is in priority override mode; if C=1, the instrument was in calibrate mode; U is not used (is always zero).
10	Format specification. Set to 0 at the beginning of the interval specified for format A/B, 1 for D, 2 for C.
11	Number of seconds of "live time" ⁽²⁾ for the main telescope system during the interval. This includes the total observed time for all PHA's (both zero and non-zero) received through the telemetry but excludes time lost due to telemetry noise.
12	Total number of "valid" main telescope pulse height events in the interval. This includes all non-zero pulse height frames that are not filled. Their DQI's may be 0 or 1.
13	Number of filled main telescope pulse height events.
14	Main telescope counting rate. $D1D2\overline{SD3D7}$ in counts/second. ⁽³⁾
15	Total number of filled low energy pulse height events in the interval.
16	Minimum value of (signal+noise)/noise ratio observed in the interval.
17	Highest value of (signal+noise)/noise ratio observed in the interval.
18-33	Total number of pulse height events in the interval having ID 0, 1, 2, ..., 15 (16 words).
34	Spacecraft identification (10 or 11)
35	$L1\overline{L2}$ ⁽⁴⁾ counting rate (counts/second). ⁽³⁾
36	$D1\overline{SD2D3D7}$ counting rate (average for the interval-cts/sec.) ⁽³⁾
37	$D1D2D4D5\overline{D6}$ counting rate (average for the interval-cts/sec.) ⁽³⁾
38	$D2D4D5D6\overline{D7}$ counting rate (average for the interval-cts/sec.) ⁽³⁾
39	Average spin rate in RPM for the interval.
40	$D1D2\overline{SD3D7}$ counting rate (average for the interval cts/sec.) ⁽³⁾

(2) "Live-time" is defined to be the time per frame (at the indicated bit rate) times the number of non-filled PHA frames times 2.

(3) A logic term is negated by a bar over the symbol. If a term (e.g. D4) does not appear, it is a "don't care" term. All times are spacecraft times.

(4) Low energy telescope; detector 1=L1, detector 2=L2.

- 41 -
TABLE II-1, Continued

HEADER WORD	DESCRIPTION
41	Live time in seconds for the low energy telescope pulse height data. The time is incremented when an event is analyzed in channels 0-27.
42	Total number of main telescope events that are non-zero and non-fill. This is the sum of words 18-33.
43	Total number of low energy telescope events that are non-fill and fall in the channel range 0-27 for both L1L2 and L1L2.
44	Total number of low energy telescope pulse height events for the condition L1L2 which are non-fill and fall in channel 1-27.
45	Total number of low energy telescope pulse height events for the condition L1L2 which are non-fill and fall in the channel 0-27.
46-48	Euler angles. (Described in Figure II-4).
49	Counting rate L1L2 (average for the interval-counts/second).
50	Livetime for D12SD3D7 Rate (seconds).
51	Livetime for L1L2 Rate (seconds).
52	Livetime for D1SD2D3D7 Rate (seconds).
53	Livetime for DdD2D4D5D6 Rate (seconds).
54	Livetime for D2D4D5D6D7 Rate (seconds).
55	Livetime for D1D2SD3D7 Rate (seconds).
56	Livetime for L1L2 Rate (seconds).
57	Number of physical data records following this header.
58-60	Date upon which the pulse height tape was generated (year, month, day).

TABLE II-2

University of Chicago Charged Particle Instrument
Pioneer 10/11
Description of Data Block Word-Pair Parameters

Descriptor	Description
ID (main telescope)	Range identification for particle in main telescope; integer 0-15.
ID (LET)	Range identification for a particle in the LET; 1 for L1L2, 2 for L1L2.
DQI*	Data quality indicator; set to 0 for good data, to 1 for suspect data.
S	Sector. This is the octant of spacecraft rotation in which the associated main telescope event was analyzed. The sector is not corrected for spacecraft attitude or location - see description of Euler angles in Figure II-4. Integer, 0-7.
D1	The telemetered pulse height analysis channel reported for the event from the detector 1. Integer, 0-127.
D2	The telemetered pulse height analysis channel reported for the event from the detector 2. Integer, 0-127.
D5	The telemetered pulse height analysis channel reported for the event from the detector 5. Integer, 0-127.
LET CH	Telemetered value of the PHA channel for the L1 detector of the low energy telescope. Integer, 0-127.

* not supplied (always zero) for all 1972 data and for 1973 data through day 172.

Pulse Height Program
Pioneer 10/11

PROGRAM:

U. of Chicago

The PHG program copies pulse height data in 3-dimensional format from the Summary Tape to a Pulse Height Tape and puts a header at the beginning of each 15-minute block of data. The header contains bookkeeping information: start and stop times of the data, instrument status, seconds of mainframe and subcom pulse height data.

The main frame pulse height data (Main Telescope) is reformatted and copied onto the PHT. Data where $PH1 = PH2 = PH5 = 0$, $ID0$ for non-calibrate data is not copied.

The subcom pulse height data (Low Energy Telescope) is formatted and copied onto the main frame data and copied. Only LET data with channel numbers between 0 and 27 are copied.

Calibrate data is excluded. It does not appear on the Summary Tape.

The header gives the initial bit rate, mode and format of the instrument during the 15-minute time period.

The Main Telescope status (detectors on or off, Priority normal or override) is invariant within the actual start and end time period given in header. If the Priority or Detector status changed, the 15-minute time block is broken.

Zero pulse heights. If a pulse height main frame with $ID = PH1 = PH2 = PH5 = 0$ is encountered, this frame does not increase the seconds of pulse height data or add to the number of events. This is a dummy frame. Only the word giving the number of zero pulse height frames preceding this dummy frame is used. This number increases the number of good frames (word 12) and seconds of pulse height data (word 11).

A 15-minute block is broken on changes in X_1 , X_2 , X_7 and Priority only.

Pioneer 10/11
Pulse Height Program

HEADER FORMAT:

The header is designed to allow for the insertion of rate data during subsequent processing. The program sets rate words to zero.

DATA RECORD FORMAT:

1. The physical records will have a variable length. The minimum number of 24-bit words is 150 (to allow programs to distinguish the 120 word headers from data records by word count) and the maximum number of words is 1020. The number of words in any physical data record must be a multiple of 3 (i.e. $N = 3M$, where $50 < M < 340$) in order for the tape to be compatible with the University of Maryland UNIVAC 1103 system. (The 1103 has 36 bit words and the SDS 930 has 24 bit words; thus $N_{36} = 2/3 N_{24}$. If N_{24} is not a multiple of 3, N_{36} will be a non-integral number of words.

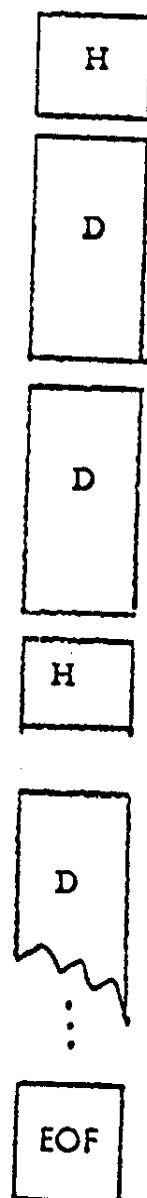
2. Word 1 of each physical data record contains the number of the physical data record. The records are numbered starting with one after each header. For example, if 5 records follow a header, Word 1 can be 1,2,3,4, or 5.

Word 2 contains the number of data word pairs in the record ($1 \leq M \leq 509$, where M is the number of pairs).

3. The pulse height events, starting with words 3 and 4, are word pairs. The Main telescope and Low Energy telescope events are differentiated by word 1, bit 0 of the pair (0 for LET, 1 for MT). The number of counts is always 1 since each word pair is an event.

Pioneer 10
Pulse Height Tape

I. TAPE STRUCTURE



- H Header record
120 24-bit words
60 Floating point words
- D Data record
150-1020 24-bit words,
Fixed point

Records are written in
binary at 800 BPI

Pioneer 10/11
Pulse Height Tape

II. DATA RECORD

Word 1
2

...

N
N+1


WORD 1 contains the physical
record number of the record
(starting from 1 after the header)

WORD 2 contains the number of
word pairs.

Words N, N+1 are the Word Pair.
 $1 \leq N \leq 509$

Pioneer 10/11
Pulse Height Program

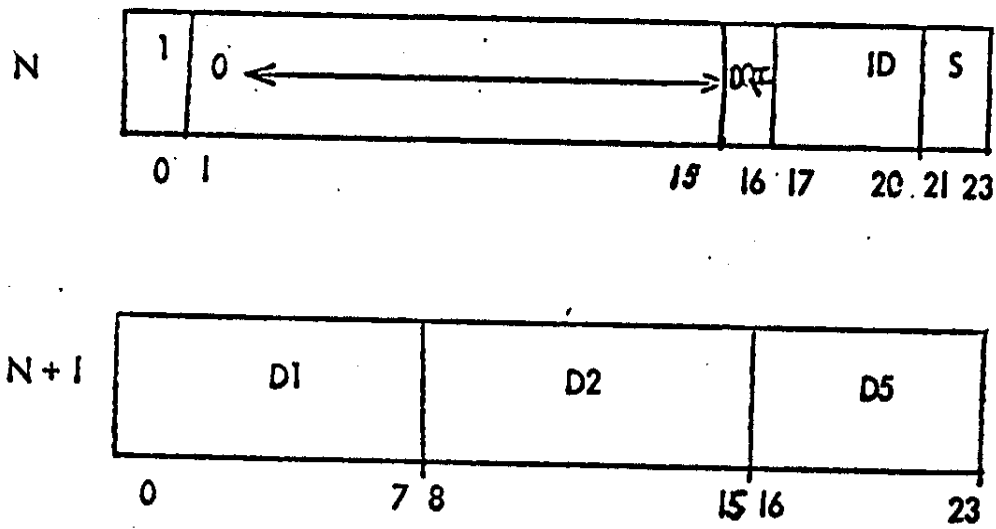


Fig. 1 Main Telescope Word Pair

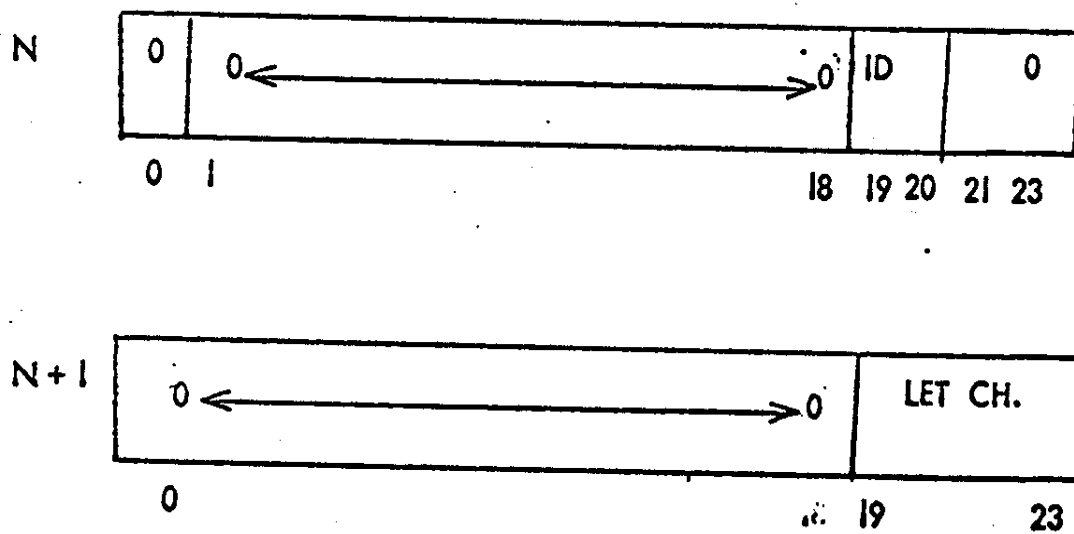


Fig. 2 LET Word Pair

Pioneer - 10/11
Pulse Height Program

Data Word-Pair Format

Bit 0 is the Least Significant Bit
 $1 \leq N \leq 509$

1. Main Telescope (see Fig. 1)

Word N, Bit 0 = 1

Word N:	BITS	INFORMATION
	0	1
	1-15	0
	16	Data Quality Indicator (0 good, 1 bad)
	17-20	ID (range 0 - 15)
	21-23	Sector (range 0 - 7)
Word N+1:	0-7	D1 channel
	8-15	D2 "
	16-23	D5 "

2. Low Energy Telescope (see Fig. 2)

Word N, Bit 0 = 0

Word N:	BITS	
	0	0
	1-18	0
	19-20	ID = 1 L1N12
		= 2 L1L2
	21-23	0
Word N+1	0-18	0
	19-23	LET channel

Pioneer 10
Pulse Height Tape

III a.

Header	60 floating point words
Word	
1	-1
2	Requested start time in days of 1972 [†]
3	Requested end time in days of 1972 [†]
4	Actual start time in days of 1972 [†]
5	Actual end time in days of 1972 [†]
6	F/T where F = Number of main Telescope Pulse Height main frames with the data quality bit set to 1 (bad data). T = Total Main frames of Pulse Height data in interval.
7	Mode (initial) = 2 for Memory Read Out data = 1 for Telemetry Store data = 0 for real time data
8	Bit Rate (initial) 16 to 2048 for the corresponding bit rate.

Bookkeeping Bits

$$\begin{aligned}\text{Word 9} &= 512X S + 256X \text{SUN} \\ &+ 128X \text{STAR} + 64X E + 32X D1 \\ &+ 16X D2 + 8X D7 + 2X U + C \\ &+ 4XP\end{aligned}$$

S = 0 if sector information is good,
1 if bad (bad if a corrected parameter was used
in the calculation of angles for the main tele-
scope rate words.)

SUN = 1 if SUN A or B reference source used
= 0 if not.

STAR = 1 if STAR reference source used
= 0 if not

E = 1 if erroneous or missing select
status occurred
= 0 if not.

Detector D1 D1 = 0 (on), = 1 (off)

Detector D2 D2 = 0 (on), = 1 (off)

Detector D5 D5 = 0 (on), = 1 (off)

Priority P = 0 (normal), = 1 (override)

U (unusual) = 0

Calibrate C = 0 (not calibrate)
= 1 (calibrate)

- 10 Format (=0, A/B) (=2,C) (initial)
- 11 Main Telescope. Seconds of Pulse Height Data (includes non-zero pulse heights and where PH1 = 0, PH2 = 0, and PH5 = 0)
- 12 Number of Good Main Frame Pulse Height Events. Includes pulse height frames that are not fill. The DQ1 may be 0 or 1. Includes frames where PH1 = 0, PH2 = 0 and PH5 = 0.
- 13 Number of Fill Main Frame Pulse Height Events
- 14 D12S - 3 - 7 Rate*
- 15 Number of Fill Low Energy Telescope Pulse Height Events
- 16 Lowest Value of Signal to Noise Ratio
- 17 Highest Value of Signal to Noise Ratio
- 18-33 Number of Pulse Height Events for ID's 0 - 15
- 34 Satellite number (10 or 11)
- 35 L1NL2 Rate*
- 36 D1SN2 Rate *
- 37 D1245N6 Rate*
- 38 D6N7 Rate*
- 39 Spin Rate*
- 40 D12NS Rate*
- 41 Seconds of Low Energy Telescope Pulse Height Data. Time incremented when L1L2 events fall in channels 0 - 27 and L1NL2 events fall in channels 0 - 27.

- 42 Number of Main Telescope events that are not all zero (PH1 = PH2 = PH5 = 0 doesn't occur) and not fill. This is the sum of words 18-33.
- 43 Number of Good Low Energy Telescope events that are not fill and fall in the channel ranges 0-27 for both L1L2 and L1N2.
- 44 Number of events for L1N2 which are not fill and fall in the channel ranges 1-27.
- 45 Number of events for L1L2 which are not fill and fall in the channel ranges 0-27.
- 46-48 Euler angles*
- 49 RL1L2
- 50 livetime for D12S rate
- 51 " " L1N2 "
- 52 " " D1SN2 "
- 53 " " D1245N6 "
- 54 " " D6N7 "
- 55 " " D12NS "
- 56 " " L12 "
- 57 Number of physical data records following the header.
- 58-60 Date Pulse Height Tape generated.

* Pulse Height Program sets this word to zero, *merged by another program*

† Day 1 hour 0 of 1972 is 1.0

Day 1 hour 0 of 1973 is 367.0

Calculation of Rate averages for Pulse Height Tapes.

The Source of rate and time data is the rate tape.

The time interval on the PHT is nominably 15 minutes and that of the rate tape is 5 minutes.

If a change in (X1, X2, X7, or Priority status) occurs, the 5 minute (on the rate tape) rates are not broken, but a flag is set. The PHT interval is broken at the time the status change occurs. The rates on the rate tape that indicate a status change occurred will not be included on the PHT.

Normally, with coverage >0 and with no changes in X1, X2, X7, P, the rate that goes onto the PHT is calculated from the formula:

$$R = \sum_i R_i t_i / \sum_i t_i .$$

where

R_i = rate on rate tape for i th summing interval

t_i = livetime from rate tape for i th summing interval

By summing interval, this means that if the PHT interval is 15 minutes and the rate tape interval is 5 minutes, then there are 3 intervals to sum over.

Here, for each rate of the 7 rates, the time word >0 and the rate ≥ 0 .

If there is a status change during a rate interval, the rate for that summing interval is set to zero as well as the time in the above formula.

A rate word and time word can both = -1.

This means:

- 1) There was no coverage, or
- 2) There was a spike on the rate plots and the words were set to -1 for the time period of the spike.

Pioneer 10/11

Pulse Height Tapes

The Pulse Height Tape data records have pulse height events composed of word pairs. The main telescope pulse heights have a data quality bit (DQI) which indicates whether the data was good (=0) or bad (=1).

All Pioneer-11 pulse height data includes this bit.

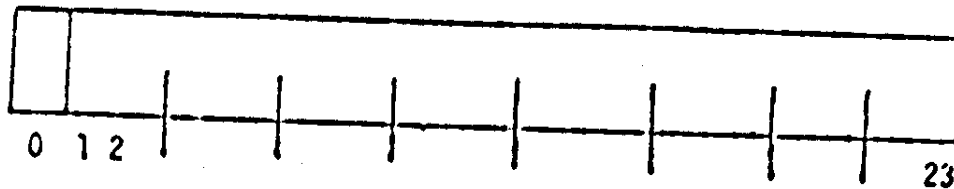
Pioneer-10 1972 data does not include this bit before 1973 day 173, but includes it for 1973 day 173 and later data.

Appendix V-1

Number Representation

FIXED-POINT FORMAT

Fixed-point data words have the format:



Numbers held in this format are 8-digit, octal numbers, with the sign incorporated as the "leading bit" in the most significant octal digit. Bit position 0 is the sign bit, with negative numbers having a "1" in bit position 0 and positive numbers having a "0" in bit position 0.

The memory holds fixed-point numbers as 23-bit fractions with an assumed binary point to the left of bit position one. Numbers held in one word have the equivalent precision of over six decimal digits. The range of values of the fixed-point format is from minus one to slightly less than plus one. Scaling is used in handling numbers during computation.

Programmers sometime consider fixed-point numbers to be integers, with the binary point to the right of bit position 23. The range of integer values is from -2^{23} to $+2^{23}-1$.

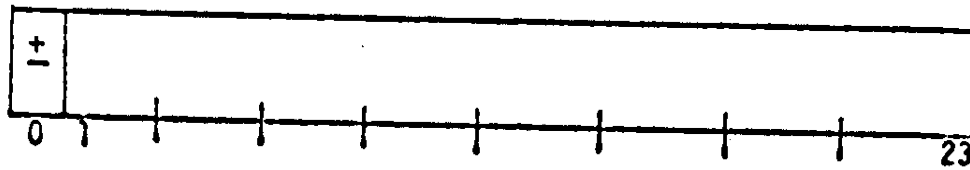
The memory holds negative, fixed-point numbers in two's complement form; the computer operates on these numbers arithmetically in a two's complement number system.

FLOATING-POINT FORMAT

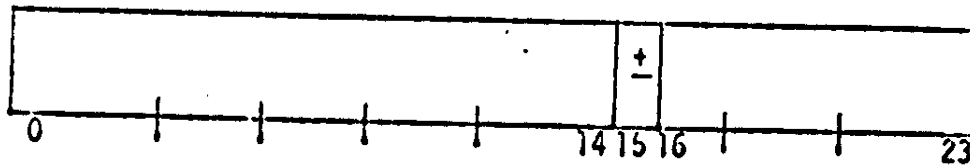
SDS offers standard programmed operator packages for performing double and single-precision floating-point arithmetic. The following paragraphs explain the standard floating-point number formats.

Double-Precision Floating-Point Format

Most Significant Word



Least Significant Word



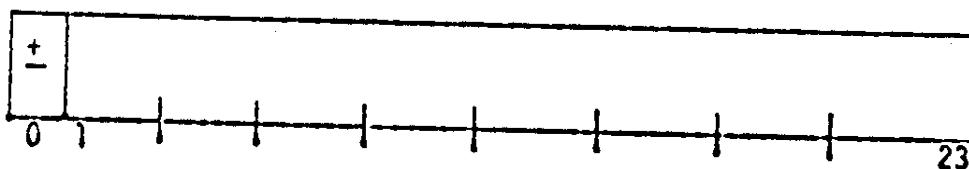
The fractional portion of a double-precision, floating-point number is a 39-bit, proper fraction, with the leading bit being the sign bit and the assumed binary point just to the left of the most significant magnitude bit (bit 1 of the upper word).

The floating-point exponent is a 9-bit integer, with the leading bit being the sign. The standard routines operate on both fraction and exponent in two's complement form. If F represents the contents of the fractional field and E represents the contents of the exponent field, the number has the form $F \times 2^E$.

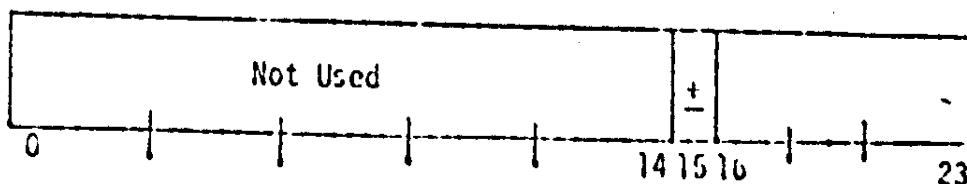
Double-precision, floating-point numbers have over 11 decimal digits of precision and a decimally equivalent exponent range of 10^{-77} to 10^{+77} .

Single-Precision Floating-Point Format

Fractional Word



Exponent Word



The fractional portion of a single-precision, floating-point number is a 24-bit proper fraction, with the leading bit being the sign and the assumed binary point just to the left of the most significant magnitude bit. The floating-point exponent is a 9-bit integer with a leading sign bit. The standard routines operate on both fraction and exponent in two's complement form.

Single-precision, floating-point numbers have over six decimal digits of precision and a decimally equivalent exponent range of 10^{-77} to 10^{+77} .

100.000 /

RECORD FORMAT

72-012A-02c

YEAR										SPACECRAFT NUMBER									
STATUS																			
ENTER ANGLE																			
ENTER ANGLE																			
ENTER ANGLE																			
NUM. BAD FRAMES (DGI=1)										NUM. GOOD FRAMES (DGI=0)									
SPIN																			
RATE																			
1 { MAIN FRAME START TIME																			
(in sec. of the ymn)																			
10 MAIN FRAME STOP TIME																			
(in sec. of the ymn)																			
SEC. OF DATA (COVERAGE) FOR R1																			
FRAME RATES																			
SEC. OF DATA (COVERAGE) FOR R2																			
FRAME RATES																			
SEC OF DATA (COVERAGE) FOR SECTORED																			
R1 FRAME RATES - SECTOR 0																			
" - SECTOR 1																			
" - SECTOR 2																			
" - SECTOR 3																			
" - SECTOR 4																			
" - SECTOR 5																			
" - SECTOR 6																			
" - SECTOR 7																			
SEC. OF DATA (COVERAGE) FOR SECTORED																			
R2 FRAME RATES - SECTOR 0																			
" - SECTOR 1																			
" - SECTOR 2																			
" - SECTOR 3																			
" - SECTOR 4																			
" - SECTOR 5																			
" - SECTOR 6																			
" - SECTOR 7																			

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
SUBCOM START TIME																							49
(in sec. of the year)																							50
SUBCOM STOP TIME																							51
(in sec. of the year)																							52
SEC. OF DATA (COVERAGE) FOR																							53
SUBCOM RATE - FISSION 2																							54
COVERAGE FOR SUBCOM RATE																							55
FISSION 1																							56
COVERAGE FOR SUBCOM RATE																							57
D2-67																							58
COVERAGE FOR SUBCOM RATE																							59
L1L2																							60
COVERAGE FOR SUBCOM RATE																							61
D125																							62
MAIN FRAME OMNIDIRECTIONAL																							63
RATE - L1L2																							64
MAIN FRAME OMNIDIRECTIONAL																							65
RATE - DISD237																							66
MAIN FRAME OMNIDIRECTIONAL																							67
RATE - D1245-67																							68
MAIN FRAME OMNIDIRECTIONAL																							69
RATE - DISD2																							70
MAIN RATE L1L2 -																							71
SECTOR 0																							72
"																							73
SECTOR 1																							74
"																							75
SECTOR 2																							76
"																							77
SECTOR 3																							78
"																							79
SECTOR 4																							80
"																							81
SECTOR 5																							82
"																							83
SECTOR 6																							84
"																							85
SECTOR 7																							86
MAIN RATE DISD237 -																							87
SECTOR 0																							88
"																							89
SECTOR 1																							90
"																							91
SECTOR 2																							92
"																							93
SECTOR 3																							94
"																							95
SECTOR 4																							96

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
MAIN RATE DIS D237 -																							97
SECTOR 5																							98
"																							99
SECTOR 6																							100
"																							101
SECTOR 7																							102
MAIN RATE DIS D24567 -																							103
SECTOR 0																							104
"																							105
SECTOR 1																							106
"																							107
SECTOR 2																							108
"																							109
SECTOR 3																							110
"																							111
SECTOR 4																							112
"																							113
SECTOR 5																							114
"																							115
SECTOR 6																							116
"																							117
SECTOR 7																							118
MAIN RATE DIS D2 -																							119
SECTOR 0																							120
"																							121
SECTOR 1																							122
"																							123
SECTOR 2																							124
"																							125
SECTOR 3																							126
"																							127
SECTOR 4																							128
"																							129
SECTOR 5																							130
"																							131
SECTOR 6																							132
"																							133
SECTOR 7																							134
SUBCOM DIGITAL RATE -																							135
FISSION 2																							136
SUBCOM DIGITAL RATE -																							137
FISSION 1																							138
SUBCOM DIGITAL RATE -																							139
D2-67																							140
SUBCOM DIGITAL RATE -																							141
1.1.1.2																							142
SUBCOM DIGITAL RATE -																							143
D1.2.5																							144

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
SUBCOM ANALOG																							145
CR1																							146
SUBCOM ANALOG																							147
CR2																							148
SUBCOM ANALOG																							149
CR3																							150
SUBCOM ANALOG																							151
DT																							152
SUBCOM ANALOG																							153
EGG TEMPERATURE																							154
SUBCOM ANALOG																							155
TELESCOPE TEMPERATURE																							156
MAIN FRAME END OF INTERVAL TIME																							157
(actual 5 min. boundary time in sec. of the year)																							158
SPARE																							159
SPARE																							160

PION 1911 RATE... TAPE FORMAT

U. of (HIC) 0

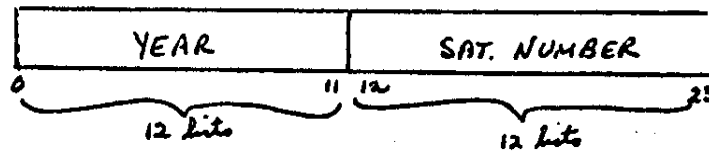
1 LOGICAL RECORD (80 FLOATING PT. WORDS) = 5 MIN. OF DATA
 PHYSICAL RECORD = 6 LOGICAL RECORDS = 480 floating point words
 or 960 words (24 bit)

YEAR + SAT. NUMBER (1)
 STATUS (2) - OBUF(1)
~~EMERGENCY~~ (3)
 (4) - (2)
 (5)
 #BAD FRs. + # Good FRs. (6) - (3)

- (4) - SPIN RATE
- (5) - M.F. start time (in sec. of the yr.)
- (6) - M.F. stop time (")
- (7) - sec. of data (coverage) for R1 frame rates
- (8) - " R2 "
- (9) - sec. of data (coverage) for sectored R1 frame rates
- (10) - sectors 0-7
- (11) - sec. of data (coverage) for sectored R2 frame rates
- (12) - sectors 0-7
- (13) - Subcom start time (in sec. of the yr.)
- (14) - Subcom stop time (")
- (15) - sec. of data (coverage) for each Subcom digital rate
- (16) - M.F. omni rate $L1\overline{L2}$
- (17) - " $D1SD2\overline{37}$
- (18) - " $D1245\overline{67}$
- (19) - " $D1SD2$
- (20) - M.F. sectored rate $L1\overline{L2}$ - sectors 0-7
- (21) - M.F. sectored rate $D1SD2\overline{37}$ - sectors 0-7
- (22) - M.F. sectored rate $D1245\overline{67}$ - sectors 0-7
- (23) - M.F. sectored rate $D1SD2$ - sectors 0-7

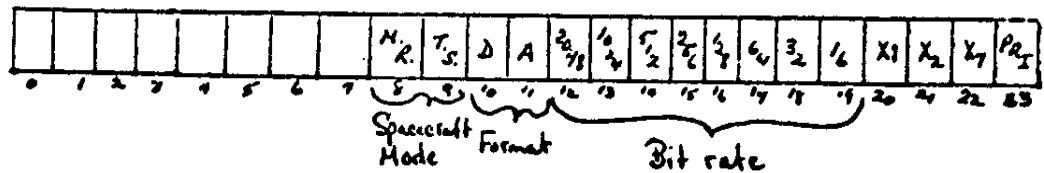
- (68) - Subcom digital - Fission 2
 (69) - " - Fission 1
 (70) - " - D2-67
 (71) - " - L1L2
 (72) - " - D125
 (73) - Subcom analog - CR1
 (74) - " - CR2
 (75) - " - CR3
 (76) - " - D7
 (77) - " - Egg Temp
 (78) - " - Telescope Temp
 - (79) - H.F. end of interval time (actual 5min boundary time)
 (80) - space (IN SECONDS OF YEAR)

word 1:
 Yr + Sat. # :



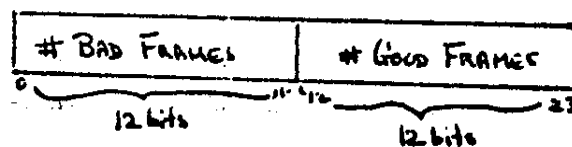
word 2:

STATUS :



word 6:

Bad frames - DQI = 1
 Good frames - DQI = 0



Pulse Height - D86240 (02A)
S6240 = 1/2/90 - 1/1/91

using

REGULAR OCTAL DUMP OF D86240

Pulse Height - P-11

FILE 1 RECORD 1 480 BYTES

(0)	600000000000	000131540000	000000153154	001225252415	315400000054	041531540012	235770150000	000000000201
(48)	000000000000	020120000000	000000072000	000000000011	000000000000	020134077776	330614122260	000000000010
(96)	000000000000	020136560421	376177730000	000000000201	300000000000	000230000000	000000020000	000000000201
(144)	360000000000	000727000000	000000053400	000000000003	000000000000	020100000000	000002010000	000000000201
(192)	000000000000	020100000000	000002010000	000000000201	000000000000	020100000000	000002010000	000000000201
(240)	000000000000	020100000000	000002010000	000000000201	260000000000	000434454215	060117762407	751306163401
(288)	000000000000	020100000000	000002012020	507516050404	223145723567	577635777776	305334122260	000000000010
(336)	240000000000	000330000000	000000022000	000000000002	000000000000	020100000000	000002010000	000000000201
(384)	275673071406	037634100061	046720123410	006104672012	341000610467	201234100061	046720123600	006200000012
(432)	360000620000	001236000062	000000122000	000000000001	200000000000	000223000000	000000053706	000000000013
(480)								

REGULAR OCTAL DUMP OF D86240

FILE 1 RECORD 2 1248 BYTES

(0)	000000010000	023340000011	214000000000	002000000001	400000102600	000040000014	242000004000	001432000000
(48)	400000133460	000040000011	222000004000	001733400000	400000163440	000040000027	330640004000	003707057000
(96)	400000143500	000040000011	336000004000	002233063000	400000152540	000040000014	340000004000	001230000000
(144)	400000133160	000000000010	000000030000	001000000002	400000112520	000040000016	236000004000	001030200000
(192)	400000153560	000040000027	316674004000	001435400000	400000103020	000040000017	244000004000	002733651000
(240)	400000133200	000040000013	336000004000	001133600000	400000173400	000040000011	330000004000	001533000000
(288)	400000133100	000040000020	324654004000	001122200000	400000253266	600040000012	262000004000	001433000000
(336)	400000142360	000040000012	356000004000	001135400000	400000103340	000040000016	366000004000	001435400000

(384)	400000133020	000040000015	332000004000	001320000000	400000172740	000040000023	014334004000	003415450400
(432)	400000262741	240040000011	206000004000	001731600000	400000321706	500040000022	344264004000	001431400000
(480)	400000133220	000040000011	344000004000	001733200000	400000163260	000040000015	334000004000	001627200000
(528)	400000133620	000040000023	272730004000	001732200000	400000153440	000040000014	342000004000	002434232400
(576)	400000352426	740040000011	220000004000	001726400000	400000163360	000040000014	240000004000	001422400000
(624)	400000123300	000040000012	222000004000	001733000000	400000162400	000040000014	250000004000	001333600000
(672)	400000263345	200000000010	000000060000	002000000005	400000103260	000040000031	236710004000	001634600000
(720)	400000152660	000040000013	262000004000	001132200000	400000172760	000040000021	324670004000	001521400000
(768)	400000133460	000040000013	324000004000	001134200000	400000123240	000040000015	316000004000	001436600000
(816)	400000133000	000040000012	336000004000	001130400000	400000232647	300040000016	330000004000	001435000000
(864)	400000153320	000040000021	320700004000	001042400000	400000173540	000040000020	300660004000	001432200000
(912)	400000133500	000040000014	336000004000	001727600000	400000321604	640040000017	336000004000	001330200000
(960)	400000122160	000040000010	256000004000	002233263400	400000273501	400040000014	320000004000	001534200000
(1008)	400000122220	000040000011	316000004000	001733200000	400000153420	000040000014	346000004000	003520264400
(1056)	400000123500	000040000012	236000004000	001733600000	400000153300	000040000016	506000004000	001422600000
(1104)	400000242627	200040000010	330000004000	001632600000	400000153120	000040000013	310000004000	002025267000
(1152)	400000113400	000040000027	322720004000	001635200000	400000173420	000040000020	340404004000	002332664400
(1200)	400000113200	000040000010	226000004000	001625400000	400000153200	000040000013	244000004000	001232400000
(1248)								

REGULAR OCTAL DUMP OF D86240

FILE 1 RECORD 3 480 BYTES

(0)	600000000000	000131540012	252524153154	002512525015	315400122601	401531540025	110514150000	000000000201
(48)	000000000000	020120000000	000000072000	000000000011	000000000000	020134077776	330614122260	000000000010
(96)	000000000000	020121042077	113533740000	000000000201	300000000000	000230000000	000000022000	000000000002
(144)	332000000000	000730000000	000000053600	000000000004	000000000000	020100000000	000002010000	000000000201
(192)	000000000000	020100000000	000002010000	000000000201	000000000000	020100000000	000002010000	000000000201
(240)	000000000000	020100000000	000002010000	000000000201	260000000000	000436115264	026607762425	473417634001
(288)	000000000000	020125252516	015243672020	507516050404	372525122434	377535777776	305334122260	000000000010
(336)	240000000000	000320000000	000000032000	000000000001	000000000000	020100000000	000002010000	000000000201
(384)	243777710006	337634100010	061110123410	001006111012	341000100611	101234100010	061110123000	001006100012
(432)	300000100610	001230000010	061000122000	000000000001	200000000000	000223000000	000000053706	000000000013
(480)								

REGULAR OCTAL DUMP OF D86240