

DATA SET CATALOG # 100

DUAL-FREQUENCY EXPERIMENTS

MARINER 5	67-060A-02A	} 1 tape
PIONEER 6	65-105A-04A	
PIONEER 7	66-075A-04A	
PIONEER 8	67-123A-03A	
PIONEER 9	68-100A-03A	

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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 This inventory information is now no longer maintained in the DSCs, but is now managed in the inventory part of the NSSDC information system.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 5

PIONEER 6, 7, 8, 9

TOTAL ELECT. CONTENT, HRLY VAL (DD)

67-060A-02A, 65-105A-04A, 66-075A-04A,

67-123A-03A, 68-100A-03A

THESE DATA SETS HAVE BEEN RESTORED. THERE WAS ORIGINALLY ONE 7-TRACK, 556 BPI TAPE, WRITTEN IN BCD. IN JANUARY OF 2005, IT WAS DECIDED TO SEPARATE THE DATA SETS AND GIVE THEM THEIR OWN MEDIA NUMBER SO THEY WOULD BE UNIQUELY IDENTIFIED FOR THE TAPE MIGRATION PROCESS. THESE D TAPES NEVER ACTUALLY EXISTED, EXCEPT ON PAPER. THEY HAVE BEEN RELEASED, JUST LIKE ANY OTHER NUMBER. 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 ORIGINAL TAPE (D005914) WAS CREATED ON AN IBM 360 COMPUTER AND WAS RESTORED ON AN IBM 360 COMPUTER. THE DR AND DS NUMBERS ALONG WITH THE CORRESPONDING D NUMBER AND TIME SPANS ARE AS FOLLOWS:

DR#	DS#	D#	FILES	TIME SPAN	MISSION
DR005207	DS005207	D005914	1	06/14/67 - 11/21/67	MAR 5
		D109578	2	12/16/65 - 07/11/66	PIO 6
		D109579	3	08/18/66 - 11/29/67	PIO 7
		D109580	4	12/14/67 - 08/25/69	PIO 8
		D109581	5	11/08/68 - 07/16/69	PIO 9

DUAL FREQUENCY EXPERIMENTS

SATELLITE	NSSDC-ID	FILE	START-TIME	STOP-TIME	
MARINER 5	67-060A-02A	File 1	June 14, 1967	Nov. 21, 1967	100
PIONEER 6	65-105A-04A	File 2	Dec. 16, 1965	July 11, 1966	58
PIONEER 7	66-075A-04A	File 3	Aug. 18, 1966	Nov. 29, 1967	104
PIONEER 8	67-123A-03A	File 4	Dec. 14, 1967	Aug. 25, 1969	653
PIONEER 9	68-100A-03A	File 5	Nov. 08, 1968	July 16, 1969	251

Cards were loaded on tape D-05916 (C-04731) with data above

Tape is 556, BCD 7-track, with 5 files



## STANFORD ELECTRONICS LABORATORIES

RADIO SCIENCE LABORATORY  
STANFORD, CALIFORNIA

20 December 1968

Mr. Lee Dubach  
NSSDC (Code 601)  
NASA Goddard Space Flight Center  
Greenbelt, MD 20771

Dear Mr. Dubach:

Following our telephone conversation today, I am enclosing a summary of hourly electron-content measures obtained by our dual-frequency experiments aboard Pioneers 6, 7, and 8. Initial submissions of similar data for Pioneer 9 will become available next month. The data submitted herewith are in three forms:

- (1) Punched cards, with roughly one card per day of data
- (2) Printed version of the card data, for your convenience in microfilming
- (3) Plotted version of the same data, which I understand you will microfilm.

Although we may choose to send different forms of data later when we become familiar with your operation, I anticipate that you can make use of these forms of data in two ways:

- (a) You can put the digital data from the cards onto a tape, if you so desire.
- (b) You can microfilm the printed and plotted forms, since they complement one another.

Periodically, I will revise all these data, deleting errors and making small corrections to the numbers. Anyone who uses this particular set should be warned that it does indeed contain errors, since it was originally generated with another purpose in mind and for that other purpose the errors were immaterial. This is particularly true of the Pioneer 7 data. I anticipate that in January 1969 I will send you a complete replacement, but this set will serve to get us started and let us become familiar with each other's mode of operation.

Pioneer 5 67-6204  
Pioneer 6 65-1021  
7 66-0724  
8 67-1238

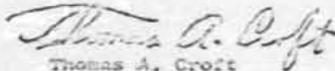
Mr. Leo Dubach

-3-

20 December 1965

For the guidance of those who may use these data, I have written a brief explanation of the data format and the meaning of the plots. This should probably be microfilmed together with data forms 2 and 3 and you might also incorporate the text into the tape. Perhaps when we advance further, you might wish to have us supply such explanations on punched cards, since this would make your digital taping easier. If you see such things that we can do for you, please let us know and we'll attempt to help whenever it's practical.

Sincerely yours,



Thomas A. Croft  
Research Engineer  
Stanford Center for  
Radar Astronomy

TAC:sb

Enclosures: H-P cards, mixed series "C" and "D" for Pioneers 6, 7, and 8  
H-P card printout  
H-P plots  
Explanatory text

STANFORD CENTER FOR RADAR ASTRONOMY  
STANFORD UNIVERSITY  
Stanford, California 94305

20 December 1968

EXPLANATION OF THE FORMAT OF HP CARDS AND PLOTS

These data provide an hourly estimate of the integrated electron content between the earth-based transmitter and the Pioneer spacecraft, as measured by the Stanford dual-frequency experiment. The numerical data were obtained manually from analog plots of the real time data, and are designed to serve only as a first estimate. The final data reduction yields much more highly-resolved data which is free of many sources of error that may affect these "HP" data. Nevertheless, it is felt that the HP estimates will be of value to others who can use them to find gross trends and indications of isolated large events.

Card Format

Column:           1           2           3           4           5           6           7           8  
Data:   HPD 66 245 23 123 122 113 108 098 088 094 087 096 015 041 067 078 078 124 157 1

First Item: "HPD" means the data is "HP" data of series D. Each time the data are corrected in any way, the series letter will be advanced.

Second Item: "66" means the year in which the first electron content value occurred was in 1966. This first value is the sixth item on the card.

Third Item: "245" means the first value occurred on day 245 of the year.

Fourth Item: "23" means the first value was measured at 2300 hours UT on that day.

#### Card Format (continued)

Fifth Item: "123" identifies the particular Stanford transmission. The first digit is the Pioneer number, so this is Pioneer 7. The next three digits correspond to the DSS "pass number", except that for the Australian receivers, the pass number is 1 digit higher. In this example, the data would be combined from pass 123 of South Africa, Spain, and California and from pass 124 of Australia.

Sixth Item, and all subsequent 3-digit numbers: These are hourly measures of the integrated density in units of  $10^{15}$  electrons per square meter, measured from the Stanford transmitting antenna to the spacecraft. The marked diurnal change is caused by our varying look angle through the earth's ionosphere.

Last Item: A single digit. If this is non-zero, the card is the last one in a deck.

#### Plot Format

The plots were designed to supplement the cards and cannot be understood without reference to the cards. There is one plot for each card, and the plots appear in groups of seven which were originally designed to fit a standard page. Each plot shows the electron content vs. time of day, and each has an individual baseline which is drawn along the time axis at a scale of 10 hours per inch. Each baseline is 24 hours long, with a 0.25 inch vertical tick at its center which is at either 1200 hours or 2400 hours UT. The baseline slips right or left in 12-hour increments in such a manner that the corresponding plot always lies over its own baseline, and there are no 24-hour horizontal slips. In order to find the date and time, it is usually necessary to refer to the HP cards.

The ordinate is the electron content, drawn at a scale of 1 inch =  $10^{15}$  electrons per square meter. Thus a card entry of 100 leads to a plot 1 inch high.

The spacing between cards is only 1.4 inches, so many content plots overlap the baseline above. This is seldom troublesome and can always be resolved by using the clue provided by the break between groups of seven plots.

A small label lying just above each baseline identifies the card from which the plot was derived. This label consists of a series of letters which occur sporadically, followed by a series of 4 numbers which always appear. The 4 numbers are the transmission number, which was explained above. The letters are intended to help us find faults in the HP cards, and they should be ignored.