



#316

IMP F AND G

2.73 MIN COUNT RATES ON TAPE

67-051A-09B, 10B

69-053A-09B, 10B

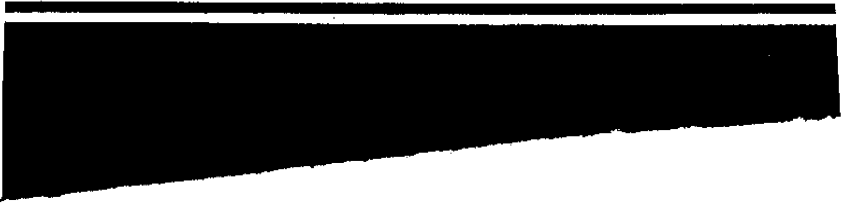


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1. INTRODUCTION:

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 This inventory information is now no longer maintained in the DSCs, but is now managed in the inventory part of the NSSDC information system.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

IMP F AND G

2.73 Minute Count Rates On Tape

67-051A-09B, 10B SPHE-00107

69-053A-09B, 10B SPHE-00232

This catalog consists of 2 IMP-F and 4 IMP-G 2.73 Min. Count Rates data tapes. These data sets have been restored. The original tapes were 1600 BPI tapes, binary, 9-track. The DR tapes are 3480 cartridges and the DS tapes are 9-track, 6250 BPI, binary and are multi-filed. The tapes were created on the IBM/360. Each physical record contains 10 logical records containing 408 bytes and 157 logical words.

The DR, DS, and DD numbers along with the time spans are given as follows:

IMP-F

DR#	DS#	DD#	FILES	TIME SPAN
DR02663	DS02663	DD-20549	1	05/24/67 - 08/31/67
		DD-20527	2	09/01/67 - 12/31/67
		DD-20526	3	01/01/68 - 04/30/68
		DD-20525	4	05/01/68 - 08/31/68
		DD-20529	5	09/01/68 - 12/31/68
DR02664	DS02664	DD-20528	1	01/01/69 - 05/03/69

IMP-G

DR02643	DS02643	DD-20540	1	06/21/69 - 10/31/69
		DD-20539	2	11/01/69 - 02/28/70
		DD-20538	3	03/01/70 - 06/30/70
DR02644	DS02644	DD-20537	1	07/01/70 - 10/31/70
		DD-20536	2	11/01/70 - 02/16/71
		DD-20535	3	02/16/71 - 05/26/71
DR02645	DS02645	DD-20534	1	05/28/71 - 10/17/71
		DD-20533	2	09/01/71 - 11/15/71
		DD-20550	3	02/01/72 - 04/30/72
DR02646	DS02646	DD-20532	1	05/01/72 - 07/17/72
		DD-20531	2	07/18/72 - 10/17/72
		DD-20530	3	10/18/72 - 11/29/72

IMP F AND G

2.73 Minute Count Rates On Tape

67-051A-09B, 10B

69-053A-09B, 10B

This catalog consists of 2 IMP-F and 4 IMP-G 2.73 Min. Count Rates data tapes. These data sets have been restored. The original tapes were 1600 BPI tapes, binary, 9-track. The DR tapes are 3480 cartridges and the DS tapes are 9-track, 6250 BPI, binary and are multi-filed. The tapes were created on the IBM/360. Each physical record contains 10 logical records containing 408 bytes and 157 logical words.

The DR, DS, and DD numbers along with the time spans are given as follows:

IMP-F

DR#	DS#	DD#	FILES	TIME SPAN
DR02663	DS02663	DD-20549	1	05/24/67 - 08/31/67
		DD-20527	2	09/01/67 - 12/31/67
		DD-20526	3	01/01/68 - 04/30/68
		DD-20525	4	05/01/68 - 08/31/68
		DD-20529	5	09/01/68 - 12/31/68
DR02664	DS02664	DD-20528	1	01/01/69 - 05/03/69

IMP-G

DR02643	DS02643	DD-20540	1	06/21/69 - 10/31/69
		DD-20539	2	11/01/69 - 02/28/70
		DD-20538	3	03/01/70 - 06/30/70
DR02644	DS02644	DD-20537	1	07/01/70 - 10/31/70
		DD-20536	2	11/01/70 - 02/16/71
		DD-20535	3	02/16/71 - 05/28/71
DR02645	DS02645	DD-20534	1	05/28/71 - 10/17/71
		DD-20533	2	09/01/71 - 11/15/71
		DD-20550	3	02/01/72 - 04/30/72
DR02646	DS02646	DD-20532	1	05/01/72 - 07/17/72
		DD-20531	2	07/18/72 - 10/17/72
		DD-20530	3	10/18/72 - 11/29/72

SUMMARY OF INFORMATION ON GSFC IMP 4 AND IMP 5

COSMIC RAY EXPERIMENT DATA TAPES

NATIONAL SPACE SCIENCE DATA CENTER

July, 1975

INTRODUCTION

The GSFC experiments on IMP's 4 and 5, designed primarily to measure 4-80 MeV solar and galactic protons and alpha particles, consisted of two telescopes - the medium energy detector (MED) and the low energy detector (LED). In addition two very low energy detectors (VLED1 and VLED2) were flown on IMP 5 to extend the measureable energy range down to 80 KeV.

This note is intended to convey only the most salient features of these instruments and to describe the characteristics of and contents of the magnetic tapes containing the data from these instruments. For further details see J. Kinsey's thesis and M. Van Hollebeke's discussion of the instruments and the data (both included with this information package).

GENERAL

The MED was a scintillator telescope aligned along the spacecraft spin axis while the LED was a solid state telescope whose axis was normal to the spin axis. Each telescope consisted of three sensors, the thin A sensor (primarily for dE/dx determination), the relatively thick B sensor (primarily for total energy determination) and the C sensor (for anticoincidence). The IMP 5 VLED's were solid state sensors collimated to view normal to the spacecraft spin axis and distinguished by one having a foil cover.

The associated electronics permitted determination of count rates for coincidence modes and for individual sensors at various discrimination levels, and permitted 1024 channel pulse height analysis of A and B sensor signals for sample particles satisfying specific coincidence requirements. Table 1 summarizes the numbers of rates (4.48 sec accumulations) and pulse height analyses of particles for various modes obtained during each one or two 2.73 minute telemetry sequence. The modes indicated in Table 1 are: particles penetrating A and stopping in B (ABC, read as AB not C); particles penetrating A and stopping in or penetrating B (AB); particles causing counts in the lowest discrimination states of A, of B, and of C; and particles causing counts in upper discrimination levels of A (3 such levels for MED, designated A1, A2, and A3, and 8 such levels for LED, designated D1, D2,...D8).

TABLE 1: NUMBERS OF RATES AND PHA'S FOR VARIOUS MODES

MODE	RATES*				A,B PHA*				IMP 5	VLED RATES**
	IMP 4		IMP 5		IMP 4		IMP 5			
	MED	LED	MED	LED	MED	LED	LED			
(ABC) Low	2	2	2	1	8	4	16	8	1	1
(ABC) High	.1	1	1	1	8	4		8	1	1
(AB) Low						4			1	1
(AB) High						4			1	1
A	(A0) 1	1	(A0) 1	1					1	1
B	1	1	1	1					1	1
C	1	1	1	1					1	1
A1	1	(D1) 1	1	(D1) 1						
A2	1	(D2) 1	1	(D2) 1						
A3	1	:	1	:						
A4		1		1						
A5		1		1						
A6		1		1						
A7		1		1						
A8		(D8) 1		(D8) 1						

DISCRIM LEVEL	VLED1	VLED2
1	1	1
2	1	1
3	1	1
4	1	1
5	1	1
6	1	1
7	1	1
8	1	1

*per 2.73 minutes

**per 5.46 minutes

20

The subscripts Low and High on the ABC and AB modes refer to low and high sensor-A discriminator settings. This low/high separation was designed to facilitate the study of solar alpha particles, but, as is discussed in greater detail in van Hollebeke, such studies are only practical for IMP 5 LED data for which there is (ABC)-High rate data.

ENERGY RESPONSE

The MED ABC mode responds to 18.7 - 81.6 MeV/nucleon protons and alpha particles and electrons of about 3-20 MeV. The LED ABC mode responds to 4.2-19.1 MeV/nucleon protons and alpha particles. The MED A, A1, A2, and A3 modes have discriminator threshold levels of 130, 610, 1260, and 1760 keV; the difference in the A and A1 count rates has been attributed to 0.5 - 1.1 keV electrons by the experimenter. The LED D1, D2...D8 modes have discriminator threshold levels of 6060, 4888, 2580, 1420, 930, 740, 410, and 210 keV respectively for IMP 4 (slightly different for IMP 5); according to the experimenter, the D6-D4 rate is free of electron contribution and can be used for 0.9-1.6 MeV protons.

The IMP 5 VLED's are distinguished by virtue of VLED2 having a .282 mg/cm² foil cover. The incident proton energy thresholds in keV for the 8 discriminator levels for VLED 1 (VLED 2) are 2421 (2450), 1938 (1963), 1105 (1140), 578 (825), 365 (623), 291 (353), 154 (225), 83 (155).

Box Counts

During each of several 4.48 sec time windows for a given 2.73 min interval, telescope, coincidence mode, and discriminator setting (see Table 1 for numbers), the signals generated in the A and B sensors by the first appropriate particle incident are passed through separate 1024-channel pulse height analyzers. During times of very low levels of solar particle fluxes, a 4.48 sec interval may pass with no appropriate particle incident on the telescope.

When for many particles the channel number for the A signal is plotted versus the channel number for the B signal (one point for each incident particle analyzed) a series of tracks emerge, one for each species. It is then possible to identify boxes, or groups of elements in the A-channel-number vs B-channel-number matrix, which (except for background) may be associated with particles of a given species having a given incident energy.

The experimenter has identified a series of such boxes and in his data has given the number of counts found in each box during each 2.73-min interval. Table 2 contains the species and energy range identifications for each box. This presentation of numbers of "box counts" is made instead of giving the actual A and B channel numbers for each particle analyzed.

The experimenter has also given the number of times for a given mode and 2.73 min interval an appropriate particle actually was analyzed (e.g., "total counts above LED low threshold"), the number of times (number of 4.48 sec windows) no appropriate incident particle was seen ("total zero counts"), and the number of times the analysis of a particle was rejected due to the value of a data quality flag. For IMP 4 LED counts, only the ABC mode data is included in these counts. (AB mode PHA data is not found in this data set although after the March 1968 LED anticoincidence failure the ABC mode provides the same information as the AB mode.)

Differential Flux Determination

The differential flux associated with a given species and energy range must be determined using data taken from several (say N) 2.73 min telemetry sequences. With CRI the counts accumulated in the coincidence mode of interest during the ith sequence (except for IMP 5 LED modes, CRI is as averaged over the two ith-sequence accumulations), BCi the pulse height analysis counts accumulated in the box on interest, CPHAi the total pha counts analyzed for the relevant coincidence mode, ΔE the energy width of the box of interest and GF its geometric factor, the differential flux in units of (sec cm² ster MeV/n)⁻¹ is given by

$$\frac{dJ}{dE} = \left(\sum_{i=1}^N CRI_i \right) \times \frac{\left(\sum_{i=1}^N BC_i \right)}{\left(\sum_{i=1}^N CPHA_i \right)} \times \frac{1}{\Delta E \times GF \times 4.48 \times N}$$

Note that geometric factors for individual boxes are given in Table 2. Note that boxes 1-4 and 11-14 relate to LED (ABC) LOW mode rates and boxes 5-10, 15-19 (15-20 for 1972 data), and 29-30 relate to MED (ABC) LOW mode rates. Boxes 20-23 (21-24 for 1972) relate to LED (ABC) HIGH mode coincidence rates, which are given for IMP 5 only. As discussed further in van Hollebeke, only the IMP 5 LED can provide reliable alpha particle fluxes during moderate to large solar particle events. Note that N should be chosen large enough to assure statistical significance in the sums contributing to dJ/dE and yet small enough to avoid significant temporal changes in the spectrum of particles being measured.

TABLE 2: SPECIES, ENERGY RANGES, AND GEOMETRICAL FACTORS FOR BOX COUNTS

BOX NO.	MODE	SPECIES	IMP 4 EMIN	IMP 4 EMAX	IMP 4 5/67 - 4/68 GEOM.F.	IMP 4 EMIN	IMP 4 EMAX	IMP 4 5/68-5/69 GEOM.F.	IMP 5 EMIN	IMP 5 EMAX	IMP 5 6/69 - 11/71 GEOM.F.	IMP 5 EMIN	IMP 5 EMAX	IMP 5 2/72-11/72 GEOM.F.
1	(LED)L	proton	4.2	6.2	.764	4.2	6.2	.764	4.2	6.2	.212	4.2	6.2	.212
2	(LED)L	proton	6.2	9.5	.756	6.2	9.5	.816	6.2	9.5	.212	6.2	9.5	.212
3	(LED)L	proton	9.5	13.5	.740	9.5	13.5	.851	9.5	13.5	.212	9.5	13.5	.212
4	(LED)L	proton	13.5	19.1	.594	13.5	19.1	.754	13.5	19.1	.212	13.5	19.1	.212
5	(MED)L	proton	18.7	29.2	3.26	18.7	29.2	3.26	19.3	30.0	3.23	19.3	30.0	3.23
6	(MED)L	proton	29.2	39.7	3.14	29.2	39.7	3.14	30.0	40.0	3.12	30.0	40.0	3.12
7	(MED)L	proton	39.7	50.2	2.99	39.7	50.2	2.99	40.0	50.0	2.98	40.0	50.0	2.98
8	(MED)L	proton	50.2	60.6	2.84	50.2	60.6	2.84	50.0	60.0	2.82	50.0	60.0	2.82
9	(MED)L	proton	60.6	71.1	2.67	60.6	71.1	2.67	60.0	71.0	2.64	60.0	71.0	2.64
10	(MED)L	proton	71.1	82.0	2.52	71.1	82.0	2.52	71.0	82.0	2.47	71.0	82.0	2.47
11	(LED)L	alpha	4.3	6.2	.764	4.3	6.2	.764	4.9	6.2	.212	4.9	6.2	.212
12	(LED)L	alpha	6.2	9.5	.756	6.2	9.5	.816	6.2	9.5	.212	6.2	9.5	.212
13	(LED)L	alpha	9.5	13.5	.740	9.5	13.5	.851	9.5	13.5	.212	9.5	13.5	.212
14	(LED)L	alpha	13.5	19.5	.592	13.5	19.5	.754	13.5	19.5	.212	13.5	19.5	.212
15	(MED)L	alpha	25.0	40.0	3.15	25.0	40.0	3.51	27.5	32.5	3.18	27.5	32.5	3.18
16	(MED)L	alpha	40.0	50.0	2.98	40.0	50.0	2.98	32.5	40.0	3.10	32.5	40.0	3.10
17	(MED)L	alpha	50.0	60.0	2.83	50.0	60.0	2.83	40.0	50.0	2.98	40.0	50.0	2.98
18	(MED)L	alpha	60.0	70.0	2.67	60.0	70.0	2.67	50.0	60.0	2.82	50.0	60.0	2.82
19	(MED)L	alpha	70.0	79.0	2.50	70.0	79.0	2.50	60.0	71.0	2.64	60.0	71.0	2.64
20	(LED)L	alpha	4.3	6.2	.764	4.3	6.2	.764	71.0	82.0	2.47	71.0	82.0	2.47
21	(LED)H	alpha	6.2	9.5	.756	6.2	9.5	.816	4.9	6.2	.212	4.9	6.2	.212
22	(LED)H	alpha	9.5	13.5	.740	9.5	13.5	.851	6.2	9.5	.212	6.2	9.5	.212
23	(LED)H	alpha	13.5	19.2	.594	13.5	19.2	.754	9.5	13.5	.212	9.5	13.5	.212
24	(MED)L	alpha							13.5	19.5	.212	13.5	19.5	.212
29	(MED)L	electron	3.0	12.0	≈ 3	3.0	12.0	≈ 3	3.0	12.0	≈ 3	3.0	12.0	≈ 3
30	(MED)L	electron	12.0	21.0	≈ 3	12.0	21.0	≈ 3	12.0	21.0	≈ 3	12.0	21.0	≈ 3

Note: Energies given in MeV/n, geometric factors in cm² ster
Note: Boxes 25-28 not used.

The geometric factors for ABC rates are found in Table 2 for individual boxes. For other rates:

MED A	GF=4.25 cm ² ster
LED A	GF=60. cm ² ster
VLED(1 & 2)	GF=0.194 cm ² ster

TAPE CHARACTERISTICS

The tapes are unlabelled 9 track, 1600 bpi tapes generated on an IBM/360. Each physical record contains 10 logical records each of which in turn contains 408 bytes and 157 logical words, all the data for one 2.73 minute telemetry sequence. (RECFM=VBS, BLKSIZE=4124, LRECL=412, DEN=3). There are 6 IMP 4 tapes and 12 IMP 5 tapes, and each tape contains about 4 months of data. Time coverage is complete over the spacecraft lives except that for IMP 5, there is no data for the Nov. 15, 1971 - Feb. 1, 1972 period of greatly reduced spacecraft operations nor for the period Nov. 30, 1972 - Dec. 24, 1972 at the end of the spacecraft life.

TAPE FORMAT

WORD	NAME	BYTES	FORMAT	UNITS	DESCRIPTION	COMMENTS
1	Rate (1)	4	I	sec	Year	
2	Rate (2)	4	I	counts	Month	
3	Rate (3)	4	I	Counts	Day of Month	
4	Rate (4)	4	I	Counts	Time of Day	
5	Rate (5)	4	R	deg	Geocen s/c dist.	In units of hours
6	Rate (6)	4	R	deg	Geocen s/c lat.	
7	Rate (7)	4	R	gamma	Geocen s/c long.	
8	Rate (8)	4	R		Magnetic Field Magnitude = B	Internal Source model
9		4	R		B/Bo	
10		4	R		Accumulator on-time	
11	Rate (1)	4	I	counts	LED A	
12	Rate (2)	4	I	Counts	LED B	
13	Rate (3)	4	I	Counts	LED C	
14	Rate (4)	4	I	Counts	LED ABC	See Footnote 1
15	Rate (5)	4	I	Counts	LED ABC	See Footnote 1
16	Rate (6)	4	I	Counts	LED AB	
17	Rate (7)	4	I	Counts	LED D1	
18	Rate (8)	4	I	Counts	LED D2	
19	Rate (9)	4	I	Counts	LED D3	
20	Rate (10)	4	I	Counts	LED D4	
21	Rate (11)	4	I	Counts	LED D5	
22	Rate (12)	4	I	Counts	LED D6	
23	Rate (13)	4	I	Counts	LED D7	
24	Rate (14)	4	I	Counts	LED D8	
25	Rate (15)	4	I	Counts	MED A	
26	Rate (16)	4	I	Counts	MED B	
27	Rate (17)	4	I	Counts	MED C	
28	Rate (18)	4	I	Counts	MED AB not C	

17-18: D1 & D2 have discriminator settings too high to admit signal. These words should not be used.

28-29: Rates (18) and (19) are equivalent and should be averaged

TAPE FORMAT - continued

WORD	NAME	BYTES	FORMAT	UNITS	DESCRIPTION	COMMENTS
29	Rate (19)	4	I	Counts	MED AB not C	
30	Rate (20)	4	I	"	MED AB	
31	Rate (21)	4	I	"	MED A1	
32	Rate (22)	4	I	"	MED A2	
33	Rate (23)	4	I	"	MED A3	
34		4	I	"	VLED Control1	
35	Rate (24)	4	I	"	VLED 1	See footnote 2
36	Rate (25)	4	I	"	VLED 2	"
37	Rate (26)	4	I	"	VLED 3	"
38	Rate (27)	4	I	"	VLED 4	"
39	Rate (28)	4	I	"	VLED 5	"
40	Rate (29)	4	I	"	VLED 6	"
41	Rate (30)	4	I	"	VLED 7	"
42	Rate (31)	4	I	"	VLED 8	"
43	PHA LED	4	I	"	Total counts above LED low threshold	protons, alphas, and background (ABC only)
44	PHA LED	4	I	"	Total counts above LED high threshold	alpha particles and background (ABC only)
45	PHA MED	4	I	"	Total counts above MED low threshold	See Footnote 3
46	PHA MED	4	I	"	Total counts above MED high threshold	See Footnote 3
47	PHA LED	4	I	"	Total zero counts for LED-low	47-50: Numbers of time bins during which no incident particle of appropriate mode was observed
48	PHA LED	4	I	"	Total zero counts for LED-High	See also Footnote 3 for words 49,50.
49	PHA MED	4	I	"	Total zero counts for MED-low	
50	PHA MED	4	I	"	Total zero counts for MED-High	
51	PHA LED	4	I	"	Total counts rejected LED-low	51-54: Numbers of counts (time bins) rejected because their PHA quality flag = 0; see also Footnote 3 for words 53, 54
52	PHA LED	4	I	"	Total counts rejected LED-High	

TAPE FORMAT - continued

WORD	NAME	BYTES	FORMAT	UNITS	DESCRIPTION	COMMENTS
53	PHA MED Low	4	I	Counts	Total counts rejected MED-Low	
54	PHA MED High	4	I	"	Total counts rejected MED-High	
55	PHA LED Low	4	R		Dead time LED-Low	See Footnote 4
56	PHA LED High	4	R		Dead time LED-High	See Footnote 4
57	PHA LED Low	4	I	Counts	Total LED protons	Total of counts in boxes 1 to 4
58	PHA MED	4	I	"	Total MED electrons	Total of counts in boxes 29-30
59	PHA MED	4	I	"	Total MED protons	Total of counts in boxes 5 to 10
60	PHA MED Low	4	I	"	Total LED-Low alphas	Total of counts in boxes 11 to 14
61	PHA LED High	4	I	"	Total LED-High alphas	Total of counts in boxes 20 to 23 (21 to 24 for IMP 5, 1972)
62	PHA MED	4	I	"	Total MED alphas	Total of counts in boxes 15 to 19 (15 to 20 for IMP 5, 1972)
63		4				Unused
64-93	BXCONT(N)	2	I			Counts in 30 individual boxes; see table 2 for box identifications
94-101	LEDQF(N)	2	I		LED-Low quality flags (PHA)	See Footnote 5
102-109	LEDQF(N)	2	I		LED-High quality flags (PHA)	See footnote 6
110-125	MEDQF(N)	2	I		MED quality flags (PHA)	See Footnote 7
126		1				Unused
127-157	IFLAG(N)	1	I		Rate quality flags	See Footnote 8

FOOTNOTES ON FORMAT

1. On IMP 4 Rates 4 and 5 are equivalent and should be averaged; on IMP 5 Rates 4 and 5 are (ABC) LOW and (ABC) HIGH respectively.
2. Words 34-42 are unused for IMP 4. For IMP 5, if word 34 has the value 1, the VLED data in words 35-42 are from the VLED 1 detector; otherwise the VLED data in words 35-42 are from VLED 2. VLED 1 through VLED 8 in words 35-42 refer to the 8 discriminator settings.
3. Counts for PHA-MED-LOW are due to protons, alpha particles, electrons, and background; counts for PHA-MED-HIGH are due to alpha particles and background. The MED LOW/HIGH distinction is only relevant to IMP 4; on IMP 5 only MED-LOW was used and the information in words 45, 49, and 53 is repeated in words 46, 50, and 54 respectively.
4. Dead time is $\log_e (b/(b-n))$ where b is the total number of time bins and n is total counts from word 43 or 44 (or number of time bins with analyzed particle). See Kinsey's thesis for discussion of use of this parameter in determining quiet time count rates.
5. Value = 1 → good quality; value = 0 → bad quality.
For IMP 4: N=1-4 LED-Low (AB); N=5-8 LED-Low (ABC)
For IMP 5: N=1-8 LED-Low (ABC)
6. Value = 1 → good quality; value = 0 → bad quality.
For IMP 4: N=1-4 → LED-High (AB); N=5-8 → LED-High (ABC)
For IMP 5: N=1-8 → LED-High (ABC)
7. Value = 1 → good quality; value = 0 → bad quality.
For IMP 4: N=1-8 → MED-Low (ABC); N=9-16 → MED-High (ABC)
For IMP 5: N=1-16 → MED-Low (ABC)
8. Value = 0 → good; value = 1 → bad; value = 2 → undetermined.
These flags relate to Rates 1-23 (words 11-33 of this format) for IMP 4 and to Rates 1-31 (words 11-42) for IMP 5. For IMP 4, IFLAG (24,25...31) (words 150-157) are not used.

JHK

67-051A-09B
PB

2-1

Tapes Description

IMP 4 Flux Tapes

Standard label tapes dsn = IMP F dcb = (RECFM=VBS, DEN=3, BLKSIZE=4124,
LRECL=412)

<u>Tape No.</u>	<u>Dates</u>	<u>Number of Records</u>
EP8020	May 24, 1967 - Aug. 31, 1967 ✓ May 24, 1967 - Aug. 31, 1967	49212 49212
EP8021	Sept. 01, 1967 - Dec. 31, 1967 ✓ Sept. 01, 1967 - Dec. 31, 1967	59465 59470
EP8022	Jan. 01, 1968 - Apr. 30, 1968 ✓ Jan. 01, 1968 - Apr. 30, 1968	56295 56295
EP8023	May 01, 1968 - Aug. 31, 1968 May 01, 1968 - Aug. 31, 1968	57916 57920
EP8024	Sept. 01, 1968 - Dec. 31, 1968 ✓ Sept. 01, 1968 - Dec. 31, 1968	51947 51952
EP8025	Jan. 01, 1969 - May 03, 1969 ✓ Jan. 01, 1969 - May 03, 1969	51548 51716

69-053A-09B
-10B

2-2

IMP 5 Flux TapesStandard label tapes dsn = IMP G dcb = (RECFM=VBS, DEN=3, BLKSIZE=4,24,
LRECL=412)

<u>Tape No.</u>	<u>Dates</u>	<u>Number of Records</u>
EP8026	June 21, 1969 - Oct. 31, 1969	56281
EP8027	Nov. 01, 1969 - Feb. 28, 1970	50979
EP8028	Mar. 01, 1970 - June 30, 1970	53636
EP8029	July 01, 1970 - Oct. 31, 1970	52394
EP8030	Nov. 01, 1970 - Feb. 16, 1971	47707
EP8031	Feb. 17, 1971 - May 28, 1971	44996
EP8032	May 28, 1971 - Aug. 31, 1971	42640
EP8033	Sept. 01, 1971 - Nov. 15, 1971 ✓	33588
EP8034	Feb. 01, 1972 - Apr. 30, 1972	38440
EP8035	May 01, 1972 - July 17, 1972	31176
EP8036	July 18, 1972 - Oct. 17, 1972 ✓	37260
EP8037	Oct. 18, 1972 - Nov. 29, 1972 ✓	17863

408 bytes per record

9 boxes of
Energy for
He10 boxes of
Energy for
Henot yet
in →

INTERMEDIATE FLUX TAPE FORMAT - IMP IV

<u>Word</u>	<u>Name</u>	<u>Bytes</u>	<u>Format</u>	<u>Units</u>	<u>Description</u>	<u>Comments</u>
1		4	I		Year	
2		4	I		Month	
3		4	I		Day	
4		4	I		Hour	
5		4	R	kms.	Rad. dist. center of of earth to sat.	
6		4	R	Degrees	Geom. latitude of sat. position	
7		4	R	Degrees	Geom. longitude of sat. position	
8		4	R	Gamma	B=Magnetic field length	
9		4	R		B/B ₀	
10		4	R	Sec	Accumulator on time	
11	Rate (1)	4	I	Counts	LED A	
12	Rate (2)	4	I	Counts	LED B	
13	Rate (3)	4	I	Counts	LED C	
14	Rate (4)	4	I	Counts	LED (AB not C) /	Those two logic require- ments are essentially the same and should be averaged *
15	Rate (5)	4	I	Counts	LED (AB not C) ^2	
16	Rate (6)	4	I	Counts	LED AB	
17	Rate (7)	4	I	Counts	LED D1	From the 8 level
18	Rate (8)	4	I	Counts	LED D2	integral analyzer the
19	Rate (9)	4	I	Counts	LED D3	discrimination was set
20	Rate (10)	4	I	Counts	LED D4	such that level 3 was
21	Rate (11)	4	I	Counts	LED D5	the lowest level that
22	Rate (12)	4	I	Counts	LED D6	would admit signal.
23	Rate (13)	4	I	Counts	LED D7	levels: D1 and D2 should
24	Rate (14)	4	I	Counts	LED D8	not be used.
25	Rate (15)	4	I	Counts	MED A	
26	Rate (16)	4	I	Counts	MED B	
27	Rate (17)	4	I	Counts	MED C	

The anti coincidence $\bar{c}$ of the LED experiment failed in March of 1968.

<u>Word</u>	<u>Name</u>	<u>Bytes</u>	<u>Format</u>	<u>Unit</u>	<u>Description</u>	<u>Comments</u>
28	Rate (18)	4	I	Counts	MED AB not C1	These two logic requirements are essentially the same and should be averaged.
29	Rate (19)	4	I	Counts	MED (AB not C2)	
30	Rate (19) ²⁰	4	I	Counts	MED (AB) AD?	
31	Rate (20) ²¹	4	I	Counts	MED A1	
32	Rate (21) ²²	4	I	Counts	MED A2	
33	Rate (22)	4	I	Counts	MED A3	
34 to 42		4	I			Spares
43	PHA LED Low	4	I	Counts	Total Counts above LED low threshold	**
44	PHA LED Low ^{High}	4	I	Counts	Total Counts above LED High threshold	**
45	PHA MED Low	4	I	Counts	Total Counts above MED Low threshold	**
46	PHA MED High	4	I	Counts	Total Counts above MED High threshold	**
47	PHA LED Low	4	I	Counts	Total Zero Counts LED Low	
48	PHA LED High	4	I	Counts	Total Zero Counts LED High	
49	PHA MED Low	4	I	Counts	Total Zero Counts MED Low	
50	PHA MED High	4	I	Counts	Total Zero Counts MED High	

**The LED and MED can be operated in a low and high threshold mode: an advantage of this, is to permit in the high threshold mode, more alpha particles to be counted during high flux rates.

<u>Word</u>	<u>Name</u>	<u>Bytes</u>	<u>Format</u>	<u>Unit</u>	<u>Description</u>	<u>Comments</u>
51	PHA LED Low	4	I	Counts	Total Counts Rejected LED Low	Rejected if their PHA quality Flag = 0
52	PHA LED High	4	I	Counts	Total Counts Rejected LED High	
53	PHA MED Low	4	I	Counts	Total Counts Rejected MED Low	
54	PHA MED High	4	I	Counts	Total Counts Rejected MED High	
55	PHA LED	4	R	Counts	LED Low Threshold (DEAD TIME)	$= \ln\left(\frac{b_1}{b_1 - n_1}\right)$ where b = number of time bins, and n is the total counts above threshold, for low and high threshold respectively.
56	PHA LED	4	R	Counts	LED High Threshold (DEAD TIME)	
57	PHA LED	4	I	Counts	Total LED Protons	Total of events in boxes 1-4
58	PHA MED	4	I	Counts	Total MED Electrons	Total of counts in boxes 29-30
59	PHA MED	4	I	Counts	Total MED Protons	Total of counts in boxes 5-10
60	PHA LED	4	I	Counts	Total LED Low threshold Alphas	Total of counts in boxes 11-14
61	PHA LED	4	I	Counts	Total LED High threshold Alphas	Total of counts in boxes 20-23
62	PHA MED	4	I	Counts	Total MED Low Alphas	Total of counts in boxes 15-19
63		4	I	Counts	Spare	
64-93	BXCONT(N)	2	I	Counts	(N = 1,4) LED Protons (N = 5,10) MED Protons (N = 11,14) LED Alpha Low threshold (N = 15,19) MED Alpha Low threshold (N = 20,23) LED Alpha (high threshold) (N = 24,28) SPARE (N = 29-30) MED Electrons	Counts the number of Protons, Alpha, electrons in the MED and LED Matrices. The energy range of each of these boxes is to be found in the box - Energy definition section: Page 1.
	PHA: MED LED LED					
	Boxes Energy 30 boxes (N = 1,30)					

<u>Word</u>	<u>Name</u>	<u>Bytes</u>	<u>Format</u>	<u>Unit</u>	<u>Description</u>	<u>Comments</u>
100- 101	LEDQF(N)	2	I		LED Low Gain PHA Quality Flags (N = 1,4, LED AB; = 0 bad quality N = 5,8, LED ABC; NC)	= 1 - good quality
102- 109	LEDQF(N)	2	I		LED High Gain PHA Quality Flags (N = 9,12, LED AB; N = 13,16, LED ABC; NC)	= 1: good quality = 0: bad quality
110- 125	MEDQF(N)	2	I		MED PHA Quality Flags N = 1, 8, MED Low; N = 9,16, MED High)	= 1: good quality = 0: bad quality
126		1	I		Spare	
127- 149	IFLAG	1	I		Quality Flags Representing the Quality of the 23 Rates, 0 = Good, 1 = Bad, 2 = Undetermined.	
150- 161		1	I		not to be used.	

NOTE: There are ⁴⁰⁸~~412~~ bytes per record. *Chapman, B. B. Penetration to the*
Peak Counter
 A record represents one commutator cycle
 One commutator cycle contains 23 rates: LEDA, LEDB, LEDC, LED $\overline{ABC}$,
 ----MED A3, and 32 PHA. Only particles stopping in the B detector
 of the MED and both stopping and penetrating particles in the B
 detector of the LED and Pulse Height Analyzed. There are, during a
 commutatory cycle only 16 possible PHA (time bins) in the MED.
 The first 8 ones for the low threshold and the 8 following ones
 for the MED High Threshold - only the low threshold represents a
 time sample of the MED $\overline{ABC}_1$, or $\overline{ABC}_2$. The LED Low and high threshold
 share both 8 PHA between the penetrating particles AB (first 4 PHA)

and the staffing particles ABC (the last 4 PHA). Only the Low threshold analyzes a sample of ABC_1 and ABC_2 . The quality of the data for each of those counts is described by the PHA quality Flag.

<u>Word</u>	<u>Name</u>	<u>Byte</u>	<u>Format</u>	<u>Units</u>	<u>Description</u>	<u>Comments</u>
1		4	I		Year	
2		4	I		Month	
3		4	I		Day	
4		4	R		Hour	
5		4	R	kms	Rad. dist. center of earth to sat.	
6		4	R	Degrees	Geom. latitude of sat. position	
7		4	R	Degrees	Geom. longitude of sat. position	
8		4	R	Gamma	B=Magnetic field strength	
9		4	R		B/B ₀	
0		4	R	Sec	Accumulator on time	
11	Rate (1)	4	I	Counts	LED A	
12	Rate (2)	4	I	Counts	LED B	
13	Rate (3)	4	I	Counts	LED C	
14	Rate (4)	4	I	Counts	LED (AB not C) ₁	
15	Rate (5)	4	I	Counts	LED (AB not C) ₂	
16	Rate (6)	4	I	Counts	LED AB	
17	Rate (7)	4	I	Counts	LED D1	
18	Rate (8)	4	I	Counts	LED D2	
19	Rate (9)	4	I	Counts	LED D3	
20	Rate (10)	4	I	Counts	LED D4	
21	Rate (11)	4	I	Counts	LED D5	
22	Rate (12)	4	I	Counts	LED D6	
23	Rate (13)	4	I	Counts	LED D7	

<u>Word</u>	<u>Name</u>	<u>Byte</u>	<u>Format</u>	<u>Units</u>	<u>Description</u>	<u>Comments</u>
4	Rate (14)	4	I	Counts	LED D8	
24	Rate (15)	4	I	Counts	MED A _M	
26	Rate (16)	4	I	Counts	MED B _M	
27	Rate (17)	4	I	Counts	MED C _M	
28	Rate (18)	4	I	Counts	MED (AB not C) ₁	
29	Rate (19)	4	I	Counts	MED (AB not C) ₂	
30	Rate (20)	4	I	Counts	MED (AB) A ⁰	
31	Rate (21)	4	I		MED A1	
32	Rate (22)	4	I		MED A2	
33	Rate (23)	4	I		MED A3	
34	(24)		I		VLED Control	For IMP 5: -1 VLED I *1 VLED II
35	Rate (25)	4	I	Counts	VLED 1	From the 8 level integral analyzer of VLED. Depending on the VLED control word, counts either VLED I or VLED II
36	Rate (26)	4	I	Counts	VLED 2	
37	Rate (27)	4	I	Counts	VLED 3	
38	Rate (28)	4	I	Counts	VLED 4	
39	Rate (29)	4	I	Counts	VLED 5	
40	Rate (30)	4	I	Counts	VLED 6	
41	Rate (31)	4	I	Counts	VLED 7	
42	Rate (32)	4	I	Counts	VLED 8	
43	PHA LED Low	4	I	Counts	Total Counts above LED low Threshold	Total counts in the LED Low Matrix = Counts both pro- tons and alpha particles and background
44	PHA LED High	4	I	Counts	Total Counts above LED high threshold	Total counts in the LED high matrix: Counts only alpha particles and background

<u>Word</u>	<u>Name</u>	<u>Bytes</u>	<u>Format</u>	<u>Unit</u>	<u>Description</u>	<u>Comment</u>
	PHA MED	4	I	Counts	Total Counts MED	Total counts in the MED Matrix:
46	PHA MED	4	I	Counts	Total Counts MED	Counts all PHA events which obey ABC, or ABC ₂ logic requirement: proton, alpha, electrons and background
47	PHA LED Low	4	I	Counts	Total Zero Counts LED Low	Repeats word 45 Total counts = $\frac{(45) \& (46)}{2}$

*The high threshold mode is to permit more alpha particles to be counted during high flux rate. The total counts above LED Low threshold are the PHA events which obey the AB not C1 logic requirement. The total counts above LED High threshold are total of events Pulse Height Analyzed which obey the AB not C2 logic requirement.

48	PHA LED High	4	I	Counts	Total Zero Counts LED High	
49	PHA MED	4	I	Counts	Total Zero Counts MED	} as for 45, 46 ?
50	PHA MED	4	I	Counts	Total Zero Counts MED	
51	PHA LED Low	4	I	Counts	Total Counts Rejected LED Low	
52	PHA LED High	4	I	Counts	Total Counts Rejected LED High	
53	PHA MED	4	I	Counts	Total Counts Rejected MED	} as for 45, 46 ?
54	PHA MED	4	I	Counts	Total Counts Rejected MED	
55	PHA LED Low	4	I	Counts	LED Low Threshold mode (DEAD Time)	$\log \left(\frac{b}{b-n_1} \right)$ not to be used b = nber of time bins
56	PHA LED	4	I	Counts	LED High Threshold mode (DEAD Time)	$\log \left(\frac{b}{b-n_2} \right)$ $n_1(n_2)$ = total counts above low (or high threshold)

<u>Word</u>	<u>Name</u>	<u>Bytes</u>	<u>Format</u>	<u>Units</u>	<u>Description</u>	<u>Comments</u>
57	PHA LED Low	4	I	Counts	Total LED Protons	(total of counts in boxes 1 to 6)
58	PHA MED	4	I	Counts	Total MED Electrons	(total of counts in boxes 29 & 30)
59	PHA MED	4	I	Counts	Total MED Protons	(total of counts in boxes 5 to 10)
60	PHA LED Low	4	I	Counts	Total LED Low Threshold Alphas	(total of counts in boxes 11 to 14)
61	PHA LED High	4	I	Counts	Total LED High Threshold Alphas	(total of counts in boxes (20-23) or (21-24))*
62	PHA MED	4	I	Counts	Total MED Alphas	(total of counts in boxes (15-19) or (15-20))*
63		4	I	Counts	SPARE	
64-93	BXCONT(N)	2	I	Counts	(N=1,4) LED Protons (N=5,10) MED Protons (N=11,14) LED Alpha Low *(N=15,19) MED Alpha *(N=20,23) LED Alpha High (N=24,28) SPARE (N=29,30) MED Electrons	Counts the number of Protons, alpha, electrons in the MED and LED matrices. The energy range of each of these boxes is to be found in the Box-Energy definition section. Page...

PHA: MED LED Low
LED High

Boxes Energy:

30 boxes

(N=1,30)

*For tapes from May 1971 to Dec. 1972:

(N=15,20) MED Alpha

(N=21,24) LED Alpha High

(N=25,28) SPARE

<u>Word</u>	<u>Name</u>	<u>Bytes</u>	<u>Format</u>	<u>Units</u>	<u>Description</u>	<u>Comments</u>
101	LEDQF(N) N=1,8	2	I		LED Low Gain PHA Quality Flag (N=1,8, LED ABC)	-1 good quality -0 bad quality
102-109	LEDQF(N) N=9,16	2	I		LED High Gain PHA Quality Flags (N=9,16, LED AB NC)	-1 good quality -0 bad quality
110-125	MEDQF(N) N=1,16	2	I		MED PHA Quality Flags (N=1-16)	-1 good quality -0 bad quality
126		1	I		SPARE	
127-157	IFLAG (1-31)	1	I		Quality Flags representing the Quality of the 31 Rates	0- Good 1- Bad 2- Undetermined
158-161		1	I		Not to be used Counts the record number in the tape	

There are 412 bytes/record

NOTE: A record represents one commutator cycle.
 There are 31 rates: LED A, LED B, LED C, LED ABC, ----VLED 8.
 Only particles stopping in detectors B (for LED or MED) are
 Pulse Height Analyzed: There are, during a commutator cycle,
 only 8 possible PHA (time bins) in the LED low gain - sampling
 ABC₁ - 8 possible PHA (time bins) in the LED High gain - sampling
 ABC₂ - 16 possible PHA (time bins) in the MED - sampling ABC₁
 and ABC₂ - The quality of the data for each of those counts
 by the PHA quality flag.

RECORD 5792 OF FILE
LENGTH = 2476 BYTES[illegible]

5792 RECORDS IN FILE 1 OF TAPE

```

IEC2091 YZJRJUG J00077 0C3 TR=001 TW=000, EG=000, CL=000, N=000, SID=05796
IE1421 - STEP WAS EXECUTED - COND CODE 0000
IE12651 SVS7521C.T104549, RV000, YZJRJUG, L00MOD PASSED

```

3RS 6058 W2

C3/DC 635

8/5

~~289~~

0-20530

Imp-G

10/18/72 - 11/29/72 <

730813

```
RECORD      1 OF FILE      1
LENGTH = 4124 BYTES
```

1972
05784

[illegible]

[illegible]RECORD 1787 OF FILE 1
LENGTH = 1240 BYTES

1

[illegible]

1787 RECORDS IN FILE 1 OF TAPE

```

1EE2651  SYSZ5213.06522902.8Y0001.YZJRLJJZ.I00M00. DISK DELETED
1EE2651  J0L SEK R005 K3S032. 75213.2114
1EE2651  J0R R007/ START
1EE2701  J0B /YZJRLJJZ/ STOP 0MIN 15.43SEC
- SYSTEM=MVT-21 (11-21-73) K3
- JOB 0516-
THERE WERE 03 TAPES MOUNTED FOR THIS JOB. TAPE MOUNT CHARGE WAS 00.0 MINUTES.

TOTAL TIME = 1.66 MINS=(CPU= 1.41
              .25,IO= 0.60,OTHR= .35)

```

[illegible]