



#428

SAS-2

A-RATE SUMMARY TAPE

72-091A-01D

Cat. of SAS-B GAMMA-RAY OBS;
72-091A-01F

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 This inventory information is now no longer maintained in the DSCs, but is now managed in the inventory part of the NSSDC information system.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

SAS-B

A-RATE SUMMARY TAPE

72-091A-01D ASGA-00022

This data set has been restored. There was originally one 9-track, 1600 BPI tape written in Binary. There is one restored tape. The DR tape is a 3480 cartridge and the DS tape is 9-track, 6250 BPI. The original tape was created on a 360 computer and the restored tape was created on an IBM 9021 computer. The DR and DS numbers along with the corresponding D number are as follows:

DR#	DS#	D#	FILES	TIME SPAN
-----	-----	-----	-----	-----
DR004915	DS004915	D031930	1	11/18/72 - 06/08/73

SAS-2

72-091A-01D

A-RATE SUMMARY TAPE

This data set consists of 1 SAS-2 tape. It is 9 track, 1600 BPI, Binary with 1 file. The tape was created on an IBM 360 computer. The start and stop times (SASDAY) are counted from the year of 1970.

<u>D#</u>	<u>C#</u>	<u>TIME SPAN</u>
D-31930	C-20089	11/18/72 - 06/08/73

10-5717-01D 1155 DC 10

GR 3 Bob Hartman
X-2178

SAS-2 A-RATE SUMMARY TAPE

This tape contains all of the easily available A-rate data from SAS-2. The following two periods are missing because of bad housekeeping encyclopedia tapes for which no backups were made: (SASDAY = Day of 1970)

SASDAY 1084, 15:51:18.439 to DAY 1104, 22:16:52:833

SASDAY 1127, 15:46:08.365 to DAY 1128, 15:07:47.275

It would be a major effort to regenerate those intervals from DECOM tapes, if it could be done at all.

The data are organized as follows:

Tape = 1600 bpi (unlabelled)

Block size = 2304 bytes = 32 logical records

Logical record = 72 bytes = 1 major frame

Each logical record (major frame) contains:

1	4-byte	SASDAY
1	4-byte	millisec of day
64	1-byte	A-rates

The time listed for a major frame is the beginning time for that frame.

Each major frame is (nominally) 49.152 seconds long (64 minor frames).

Each A-rate accumulation is 768 milliseconds, with the first one in a frame beginning time. The A-rate readout alternates between the two sets of four A-tubes.

The 8-bit (1 byte) A-rate readouts are a prescaled, quasi log representation of the actual counting rates. The attached table gives the conversion, as does an algorithm used in the program AREAD. A zero

(2)

rate can mean either that the PM tubes were not turned on, or that the data were not available for some reason.

A negative day number indicates that some type of problem was encountered in reading the housekeeping encyclopedia at that point. A negative millisecond indicates a time backup relative to the previous major frame. It is not known whether either or these situations were actually encountered. Occasionally interference from the SAS-1 satellite produces erroneous rates, including saturated values. The South Atlantic Anomaly produces a count rate increase during one period in each 95-minute orbit. The increase varies from barely perceptible to several hundred thousand counts per readout, depending upon the latitude of the pass.

The A-rate summary tape was written by program ATAPE (R. C. Hartman, Code 662). Program AREAD (R. C. Hartman) reads selected portions of the tape, converts the 8-bit rate readouts to actual counts, and prints a formatted dump of the results.

SAS-2 A-RATE CONVERSION TABLE

READOUT	TRUE	READOUT	TRUE	READOUT	TRUE	READOUT	TRUE
0	0	64	12288	128	61440	192	258048
1	128	65	12800	129	63488	193	266240
2	256	66	13312	130	65536	194	274432
3	384	67	13824	131	67584	195	282624
4	512	68	14336	132	69632	196	290816
5	640	69	14848	133	71680	197	299008
6	768	70	15360	134	73728	198	307200
7	896	71	15872	135	75776	199	315392
8	1024	72	16384	136	77824	200	323584
9	1152	73	16896	137	79872	201	331776
10	1280	74	17408	138	81920	202	339968
11	1408	75	17920	139	83968	203	348160
12	1536	76	18432	140	86016	204	356352
13	1664	77	18944	141	88064	205	364544
14	1792	78	19456	142	90112	206	372736
15	1920	79	19968	143	92160	207	380928
16	2048	80	20480	144	94208	208	389120
17	2176	81	20992	145	96256	209	397312
18	2304	82	21504	146	98304	210	405504
19	2432	83	22016	147	100352	211	413696
20	2560	84	22528	148	102400	212	421888
21	2688	85	23040	149	104448	213	430080
22	2816	86	23552	150	106496	214	438272
23	2944	87	24064	151	108544	215	446464
24	3072	88	24576	152	110592	216	454656
25	3200	89	25088	153	112640	217	462848
26	3328	90	25600	154	114688	218	471040
27	3456	91	26112	155	116736	219	479232
28	3584	92	26624	156	118784	220	487424
29	3712	93	27136	157	120832	221	495616
30	3840	94	27648	158	122880	222	503808
31	3968	95	28160	159	124928	223	512000
32	4096	96	28672	160	126976	224	520192
33	4352	97	29696	161	131072	225	536576
34	4608	98	30720	162	135168	226	552960
35	4864	99	31744	163	139264	227	569344
36	5120	100	32768	164	143360	228	585728
37	5376	101	33792	165	147456	229	602112
38	5632	102	34816	166	151552	230	618496
39	5888	103	35840	167	155648	231	634880
40	6144	104	36864	168	159744	232	651264
41	6400	105	37888	169	163840	233	667648
42	6656	106	38912	170	167936	234	684032
43	6912	107	39936	171	172032	235	700416
44	7168	108	40960	172	176128	236	716800
45	7424	109	41984	173	180224	237	733184
46	7680	110	43008	174	184320	238	749568
47	7936	111	44032	175	188416	239	765952
48	8192	112	45056	176	192512	240	782336
49	8448	113	46080	177	196608	241	798720
50	8704	114	47104	178	200704	242	815104
51	8960	115	48128	179	204800	243	831488
52	9216	116	49152	180	208896	244	847872
53	9472	117	50176	181	212992	245	864256
54	9728	118	51200	182	217088	246	880640
55	9984	119	52224	183	221184	247	897024
56	10240	120	53248	184	225280	248	913408
57	10496	121	54272	185	229376	249	929792
58	10752	122	55296	186	233472	250	946176
59	11008	123	56320	187	237568	251	962560
60	11264	124	57344	188	241664	252	978944
61	11520	125	58368	189	245760	253	995328
62	11776	126	59392	190	249856	254	1011712
63	12032	127	60416	191	253952	255	1028096

MODEL

DATE

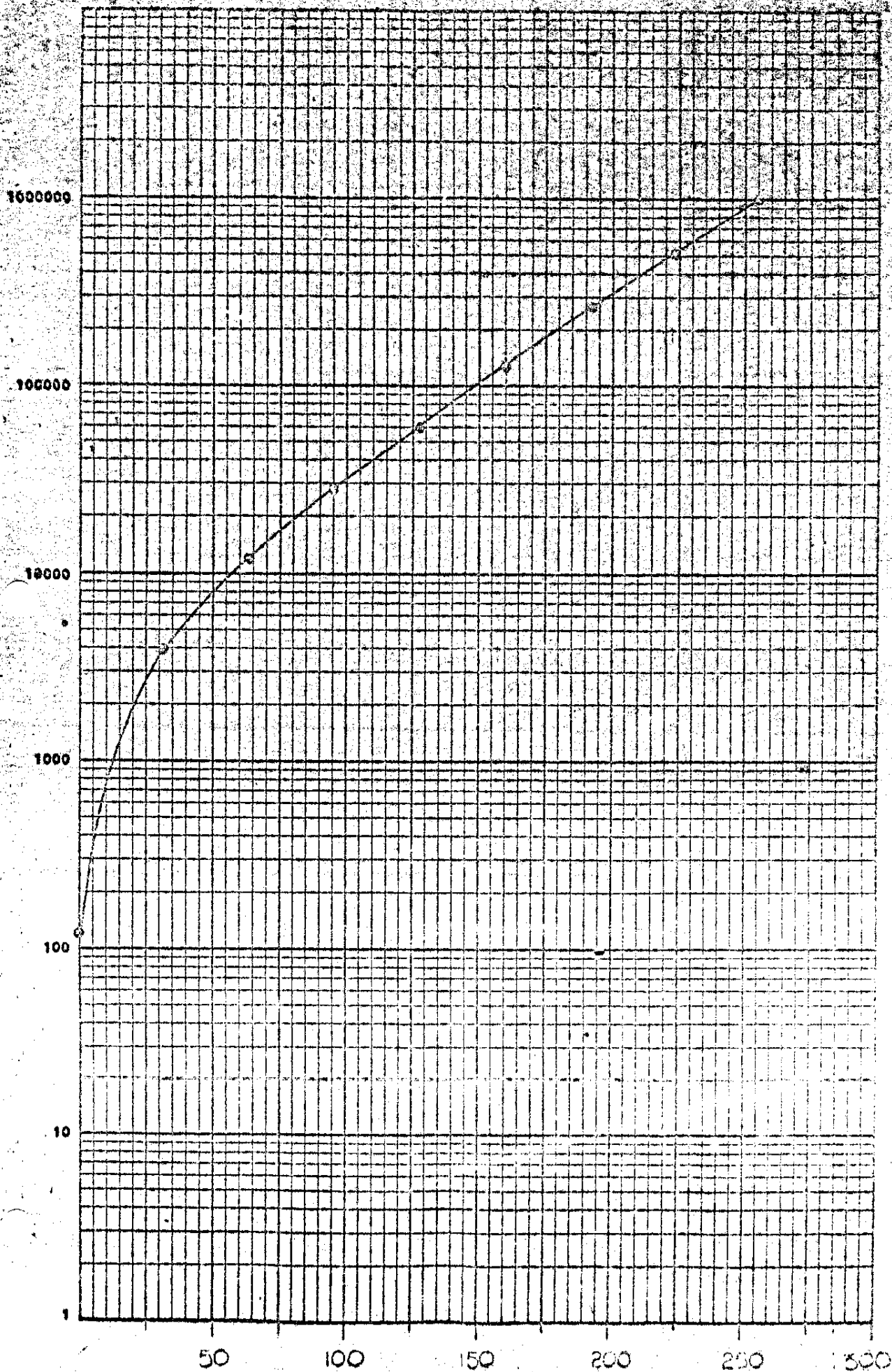
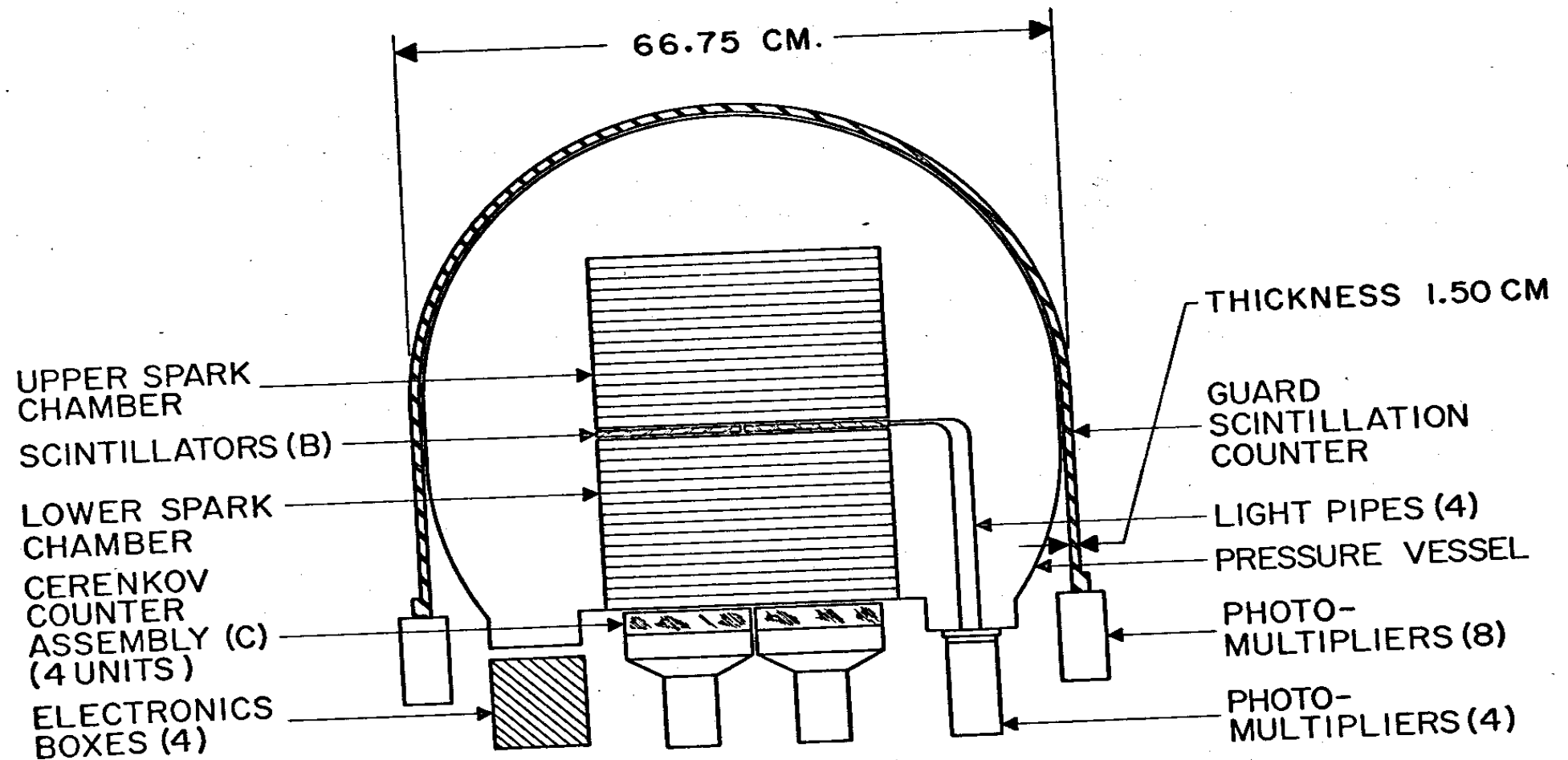
-ZAZH-
COOZ-0

FIGURE 3.4

DECIMAL READOUT



SAS-2 GAMMA RAY EXPERIMENT

D-31930

DUMP OF TAPE #422

SAS-2

INPUT TAPE X422 01 MS1
DATA INPUT H9 NF 1 FL 1 2 2

1053-1255

11/18/72 6/8/73

FILE	1	RECORD	1	LENGTH	2314BYTES
(0)	00000410	014B886F	00000000	00000000	00000000
(40)	00000000	00000000	00000000	00000000	00000000
(80)	00000000	00000000	00000000	00000000	00000000
(120)	00000000	00000000	00000000	00000000	00000000
(160)	00000000	00000000	00000000	00000000	00000000
(200)	00000000	00000000	00000000	00000000	00000000
(240)	00000000	00000000	00000000	00000000	00000000
(280)	00000000	00000000	00000000	00000000	00000000
(320)	00000000	00000000	00000000	00000000	00000000
(360)	00000410	014FA86F	00000000	00000000	00000000
(400)	00000000	00000000	00000000	00000000	00000000
(440)	00000000	00000000	00000000	00000000	00000000
(480)	00000000	00000000	00000000	00000000	00000000
(520)	00000000	00000000	00000000	00000000	00000000
(560)	00000000	00000000	00000000	00000000	00000000
(600)	00000000	00000000	00000000	00000000	00000000
(640)	00000000	00000000	00000000	00000000	00000000
(680)	00000000	00000000	00000000	00000000	00000000
(720)	00000410	0153686F	00000000	00000000	00000000
(760)	00000000	00000000	00000000	00000000	00000000
(800)	00000000	00000000	00000000	00000000	00000000
(840)	00000000	00000000	00000000	00000000	00000000
(880)	00000000	00000000	00000000	00000000	00000000
(920)	00000000	00000000	00000000	00000000	00000000
(960)	00000000	00000000	00000000	00000000	00000000
(1000)	00000000	00000000	00000000	00000000	00000000
(1040)	00000000	00000000	00000000	00000000	00000000
(1080)	00000410	0157286F	00000000	00000000	00000000
(1120)	00000000	00000000	00000000	00000000	00000000
(1160)	00000000	00000000	00000000	00000000	00000000
(1200)	00000000	00000000	00000000	00000000	00000000
(1240)	00000000	00000000	00000000	00000000	00000000
(1280)	00000000	00000000	00000000	00000000	00000000
(1320)	00000000	00000000	00000000	00000000	00000000
(1360)	00000000	00000000	00000000	00000000	00000000
(1400)	00000000	00000000	00000000	00000000	00000000
(1440)	00000410	015AE86E	00000000	00000000	00000000
(1480)	00000000	00000000	00000000	00000000	00000000
(1520)	00000000	00000000	00000000	00000000	00000000
(1560)	00000000	00000000	00000000	00000000	00000000
(1600)	00000000	00000000	00000000	00000000	00000000
(1640)	00000000	00000000	00000000	00000000	00000000
(1680)	00000000	00000000	00000000	00000000	00000000
(1720)	00000000	00000000	00000000	00000000	00000000
(1760)	00000000	00000000	00000000	00000000	00000000
(1800)	00000410	015EA86D	00000000	00000000	00000000
(1840)	00000000	00000000	00000000	00000000	00000000
(1880)	00000000	00000000	00000000	00000000	00000000
(1920)	00000000	00000000	00000000	00000000	00000000
(1960)	00000000	00000000	00000000	00000000	00000000
(2000)	00000000	00000000	00000000	00000000	00000000
(2040)	00000000	00000000	00000000	00000000	00000000
(2080)	00000000	00000000	00000000	00000000	00000000
(2120)	00000000	00000000	00000000	00000000	00000000
(2160)	00000410	0162686D	00000000	00000000	00000000
(2200)	00000000	00000000	00000000	00000000	00000000
(2240)	00000000	00000000	00000000	00000000	00000000
(2280)	00000000	00000000	00000000	00000000	00000000

(400)	2B2F2B2F	2D2F2E31	2D322C3D	2E3B2E31	2E322F34	3C332F37	313B3135	313B3437	000004E7	00192088
(443)	33373538	33393436	3538333B	353A3639	363B373C	373D373E	3B3F383F	38403A40	3B413C41	38403B40
(460)	3C423E41	3E433F43	3F434044	3E433F43	40444144	41454244	000004E7	0019E088	41454345	43464346
(520)	42474347	44474347	44484548	45484549	45494549	464A464A	4649484A	474A464C	4740474B	49404A4C
(560)	494C4A4D	4A4C4B4F	4A4E4B4F	4B4E4B4E	000004E7	001AA087	4C4F4C50	4D504D4F	4C504D50	4C514D51
(600)	4D504E52	4E514E51	4D524E51	4F544F52	4F534F53	50535053	50535153	50535054	51545054	50545254
(640)	51565156	52555256	000004E7	001E6087	51545154	52545256	52555256	52565257	52565257	51565157
(680)	53575258	52565257	52565257	51565356	52575257	53585256	51575257	52575256	52585258	53575257
(720)	000004E7	001C2087	52575257	52575257	52565256	52575156	51565157	51575157	52565155	51565156
(760)	52565055	50565055	51555054	50555054	50555054	4F544F53	50534E54	4E534F53	000004E7	001C0087
(800)	4E544E52	4E524D53	4F514E51	4D524D51	4C504B50	4D504C50	4C504B50	4B4FAA4E	4B4E4A4F	494E4A4D
(840)	4A4D4A4F	494D494D	484C484D	484C484B	474A4A49	474A474A	000004E7	001DA087	464A464C	46494648
(880)	45494448	44474446	43474346	43464246	42464145	42464144	41444144	40444143	40423F43	3E423F41
(920)	3E423F41	3D413C41	3B403A40	3C3E3A3D	000004E7	001E6087	3A3C393D	383E383B	393C3739	3639353A
(960)	37383439	34373338	32373236	34353233	31343234	2F333032	30302D3D	2D312E3D	2D3C2E2F	2C2F2C2F
(1000)	2B2E2B2D	2A2C2A2D								

FILE	INPUT	DATA RECORDS	MAX.	READ ERROR SUMMARY				INPUT RETRIES	
	RECS.	INPUT	SIZE	PERM	ZERO B	SHORT	UNDEF.	#RECS.	TOTAL#
1	8691	8693	2304	0	59	0	0	337	359

EOJ DUMP STOPPED AFTER FILE 1 # OF PERMANENT READ ERRORS 0

START TIME 08/25/78 09:20:20 STOP TIME 08/25/78 09:24:04

§ 5

REG(AF84)	4B58	31EA	3936	0945	0000	0000	000F	0882	BC0B	51B2	51C7	8156	5420	800C	800C	0080	
H0D(0000)	0000	0000	8001	6874	4120	2020	2000	0000	0100	0000	0000	0000	8001	6932	4120	2020	/ZORCH

REQ. AGENT
JLJ

RAND NO.

ACQ. AGENT
HKH

SAS-B

72-091A-01F

ASGA-00021

CAT OF SAS-2 GAMMA-RAY OBS. #7130

This data set consists of 1 SAS-2 tape. It is a 9 track, 6250 bpi, EBCDIC. The tape was created on a 3081 computer system.

D#
D-82227

C#
C-27831

FILES
5

PROCESSING OF THIS TAPE COMPLETED: TOTAL BYTES READ=0000012686 NUMBER OF DATA BLOCKS READ=000005

72-091A-01F

ASTRONOMICAL DATA CENTER

MAGNETIC TAPE FILE RECORD

Name: Ralph Post

; Date: 4 SEP 1990; Density: 6250 bpi; Coding: EBCDIC; Tracks: 9

Catalog Number	File	Catalog Name	File Name	Tape File	Number of Blocks	BLOCKSIZE Max	Min	Blocking Factor	RECFM	LRECL	Number of Records	Length (feet)
7130	1	SAS-2 Gamma-Ray Obs (Fichtel et al. 1990)	Galaxy Data	1	1	1920	1920	32	FB	60	32 ✓	0
7130	2	SAS-2 Gamma-Ray Obs (Fichtel et al. 1990)	Pulsar Data	2	1	5650	5650	113	FB	50	113 ✓	0
7130	3	SAS-2 Gamma-Ray Obs (Fichtel et al. 1990)	Pulsar Notes	3	1	1216	1216	16	FB	76	16 ✓	0
7130	4	SAS-2 Gamma-Ray Obs (Fichtel et al. 1990)	Other Sources	4	1	2850	2850	38	FB	75	38 ✓	0
7130	5	SAS-2 Gamma-Ray Obs (Fichtel et al. 1990)	Other Notes	5	1	1050	1050	15	FB	70	15 ✓	0

Totals: Number of Catalogs: 1

5 ✓

0

DEFINITIONS OF TAPE PARAMETERS:

LRECL: The logical record length in bytes; usually the length required to accommodate the data for a single object.

BLOCKSIZE: Physical record length. The maximum block size is BLOCKSIZE, but in most cases there is a short block at the end of a file, since the total number of logical records is usually not evenly divisible into an even number of blocks.

BLOCKING FACTOR: The number of logical records per physical record (BLOCKSIZE / LRECL).

NUMBER OF BLOCKS: Total number of blocks (physical records) in the file, including the short block (if present).

RECFM: The physical record format (FB = fixed length records; VB = variable length physical records, possibly due to variable length logical records; VBS = variable blocking with spanned records from block to block to eliminate record padding and to condense data storage. For tapes having variable length blocks, the minimum BLOCKSIZE in the table should be ignored, since this parameter cannot be computed in a straightforward way. If a file also has variable length logical records, the LRECL given is the longest in the file. The length is only a very rough estimate in this case, since in V-type formats each record and each block include binary control words containing length and spanning information.

LENGTH: The approximate amount of tape used, rounded to the nearest foot (should be accurate to ±10% for FB tapes).

72-0914-01F



National Space Science Data Center/
 World Data Center A For Rockets and Satellites

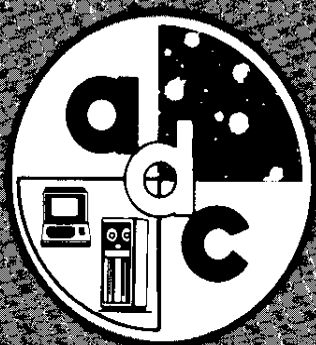
90-20

CATALOG OF DATA AVAILABLE

ONLINE AT NASA

(Revised as of 1990)

Documentation for the Microfilm Edition Version



***CATALOG OF SAS-2 GAMMA-RAY
OBSERVATIONS
(Fichtel *et al.* 1990)***

Documentation for the Machine-Readable Version

Wayne H. Warren Jr.

July 1990

National Space Science Data Center (NSSDC)/
World Data Center A for Rockets and Satellites (WDC-A-R&S)
National Aeronautics and Space Administration
Goddard Space Flight Center
Greenbelt, Maryland 20771

Abstract

The machine-readable version of the catalog, as it is currently being distributed from the Astronomical Data Center, is described. The SAS-2 γ -ray catalog contains fluxes measured with the high-energy γ -ray telescope flown aboard the second NASA *Small Astronomy Satellite*. The objects measured include various types of galaxies, quasi-stellar and BL Lacertae objects, and pulsars. The catalog contains separate files for galaxies, pulsars, other objects, notes, and references.

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1.0 Introduction

1.1 Description

The *Catalog of SAS-2 Gamma-Ray Observations* summarizes final results for high-energy γ -ray observations obtained with the second *Small Astronomy Satellite* (SAS-2) flown in an equatorial orbit by NASA from 1972 November through 1973 June. The data from the SAS-2 γ -ray experiment cover about 60 percent of the sky and 89 percent of the galactic plane for γ rays with energies > 35 MeV.

The experiment (also see Derdeyn *et al.* 1972) was a picture-type high-energy (> 35 MeV) γ -ray telescope using a 32-level wire-grid, magnetic-core spark chamber assembly covered by an anticoincidence scintillator and triggered by any one of four independent directional scintillator Cerenkov counter telescopes in anticoincidence with the outer scintillator. Thin tungsten (W) plates, 0.03 of a radiation length thick, were interleaved between the spark-chamber modules, which had an active area of approximately 640 cm^2 . The large number of W plates and spark chambers served the dual purpose of providing material for the γ rays to be converted to electron pairs that could then be clearly identified and from which their arrival directions could be determined; plus, they provided a means of ascertaining the energies of the electrons in a pair by measuring their Coulomb scattering. The full width at half-maximum field of view (FOV) was 35° , and within the FOV the average angular uncertainty for determining the arrival direction of an individual γ ray projected on one plane was about $2^\circ 6'$ at 100 MeV and varied with energy approximately as $E^{-1/2}$ in the energy range 35-200 MeV. For descriptions of the instrument calibration, data analysis procedures, and in-flight performance checks, see Fichtel *et al.* (1975) and Hartman *et al.* (1979).

This document describes the machine-readable version of the *Catalog of SAS-2 Gamma-Ray Observations* as it is currently being distributed from the National Space Science Data Center (NSSDC), its Astronomical Data Center (ADC), and the international network of astronomical data centers. It is intended to enable users to read and process the computerized catalog without problems and guesswork, and it should be used only to supplement the information contained in the published papers. In addition to the primary source references given below, those papers include Lamb *et al.* (1977), Thompson *et al.* (1977a, 1977b, 1983), and Fichtel, Thompson, and Lamb (1987). Since some of the data in the machine-readable files do not correspond exactly with those in the various published tables, users of the machine version are encouraged to study the format descriptions given in the following sections of this document before using and interpreting the data. A copy of this document should be transmitted to any recipient of the machine-readable catalog originating from the any of the international network of astronomical data centers.

1.2 Primary Source References

- Bignami, G. F., Fichtel, C. E., Hartman, R. C., and Thompson, D. J. 1979, *Astrophys. J.* **232**, 649-658.
- Fichtel, C. E., Hartman, R. C., Hunter, S. D., Kniffen, D. A., Thompson, D. J., Ögelman, H. B., Tümer, T., and Özel, M. E. 1990, *Catalog of SAS-2 Gamma-Ray Observations*, Laboratory for High Energy Astrophysics, NASA Goddard Space Flight Center.
- Fichtel, C. E., Hartman, R. C., Kniffen, D. A., Thompson, D. J., Bignami, G. F., Ögelman, H., Özel, M. E., and Tümer, T. 1975, *Astrophys. J.* **198**, 163-182.
- Ögelman, H., Fichtel, C. E., Kniffen, D. A., and Thompson, D. J. 1976, *Astrophys. J.* **209**, 584-591.

2.0 Structure

2.1 File Summary

The machine version of the *Catalog of SAS-2 Gamma-Ray Observations* consists of five files. Table 1 gives the machine-independent file attributes. All logical records are of fixed length. (Since all files are short, each will consist of a single block of differing length if blocked data are supplied on magnetic tape.)

Catalog of SAS-2 Gamma-Ray Observations (Fichtel <i>et al.</i> 1990)				
File	Contents	Record Format	Logical Record Length	Total Number of Logical Records
1	Galaxy Data	FB	60	32
2	Pulsar Data	FB	50	113
3	Pulsar Notes	FB	76	16
4	Other Sources	FB	75	38
5	Other Notes	FB	70	15

Table 1. Summary Description of Catalog Files: FB = Fixed length blocks

The information contained in the above table is sufficient for a user to describe the indigenous characteristics of the machine-readable version of the *Catalog of SAS-2 Gamma-Ray Observations* to a computer. Information easily varied from installation to installation, such as block size (physical record length), blocking factor (number of logical records per physical record), total number of blocks, density, number of tracks and character coding (ASCII, EBCDIC) for tapes, is not included, but should always accompany secondary copies if any are supplied to other users or installations.

2.2 Galaxy Data (File 1 of 5)

This file is uniformly formatted and contains the SAS-2 observations of various types of galaxies, as published in Bignami *et al.* (1979). Some of the data and other information presented in Table 1 of the published paper are not included in the machine-readable file; hence, the former should be consulted when using the latter.

Table 2 gives a byte-by-byte description of the contents of the galaxy file. A suggested Fortran format specification for reading each data field is included and can be modified depending upon individual programming and processing requirements (Fortran 77 character string-type formats are used). Certain data fields are blank when data are absent and these are indicated by the default values in the table.

Byte(s)	Units	Suggested Format	Default Value	Data
1-13	---	A13	---	Object designation
14	---	1X	---	Blank
15	---	A1	---	Object type
16-17	---	2X	---	Blank
18-23	hours	F6.3	---	Right ascension
24-25	---	2X	---	Blank
26-30	°	F5.1	---	Declination
31-32	---	2X	---	Blank
33-40	*	E8.1	blank	35-100 MeV emission limit
41-42	---	2X	---	Blank
43-50	**	E8.1	---	> 100 MeV emission limit
51-52	---	2X	---	Blank
53-60	ergs ⁻¹	E8.1	blank	Luminosity limit

Table 2. Galaxy File Record Format

* Units are keV cm⁻² s⁻¹ keV⁻¹

** Units are photons cm⁻² s⁻¹

Object designation Common name or abbreviation for the observed object.

Object type A letter code that designates the following types:

S Seyfert galaxy

N N-type galaxy

B BL Lacertae object

Q Quasi-stellar object

E Sharp emission-line galaxy

O Other type of galaxy

Equatorial coordinates Decimal hours and degrees for equinox B1950.0.

Energy Upper limits in the 35-100 MeV and > 100 MeV energy ranges, as determined by using the diffuse γ -ray emission level based on the analysis of Fichtel, Simpson, and Thompson (1978). These are 95% confidence upper limits calculated using the statistical analysis techniques of Hearn (1969), equations (12) and (13).

Luminosity limit The 95% confidence upper limit to the γ -ray luminosity for $E > 100$ MeV.

2.3 Pulsar Data (File 2 of 5)

The file is uniformly formatted and contains observations of pulsars published by Ögelman *et al.* (1976) and Thompson *et al.* (1977a, 1977b, 1983). The machine-readable file differs somewhat from the published tables in that estimated distances are given in kiloparsecs and γ -ray luminosity limits are in logarithmic form; the published χ^2 data are not present in the machine version.

Table 3 provides a description of the pulsar file. All data fields in this file contain valid data; *i.e.*, there are no blank fields and no default values are reported.

Byte(s)	Units	Suggested Format	Default Value	Data
1-7	---	A7	---	Pulsar designation
8-9	---	2X	---	Blank
10-15	s	F6.4	---	Period
16-17	---	2X	---	Blank
18-26	$10^{-15} \text{ s s}^{-1}$	F9.3	---	Period change
27	---	1X	---	Blank
28-32	kpc	F5.2	---	Distance
33-34	---	2X	---	Blank
35-38	*	F4.1	---	Pulsed flux limit
39-40	---	2X	---	Blank
41-45	**	F5.2	---	Luminosity limit
46-47	---	2X	---	Blank
48-50	---	A3	---	Notes and references

Table 3. Pulsar File Record Format

* Units are $10^{-6} \text{ cm}^{-2} \text{ s}^{-1}$

** Units are photons s^{-1}

Pulsar designation Standard pulsar coordinate designation (PSR) in hours and minutes of right ascension and degrees of declination.

Period The pulsar period

Period change Derivative of the period, which is the rate of pulsar spin up or spin down, in units of $10^{-15} \text{ s s}^{-1}$.

Distance The approximate distance of the object, as taken from Taylor and Manchester (1975).

Pulsed flux limit The 2σ upper limit of the pulsed γ -ray flux above 35 MeV in units of $10^{-6} \text{ cm}^{-2} \text{ s}^{-1}$. For most of the pulsars, this limit was calculated based on the highest single peak in the pulsar phase plot (see Ogelman *et al.* 1976 for details).

Luminosity limit Upper limit to the γ -ray luminosity, as determined from the upper limit to the flux and the distance estimates of Taylor and Manchester (1975). An emission solid angle of 1 steradian was assumed; the luminosity was calculated as:

$$L = 1 \cdot Fd^2,$$

where F is the observed flux and d is the distance. Note that these upper limits do not truly reflect actual upper limits in the sense that neither the distance nor the emission solid angle is accurately known for any pulsar.

Notes and references Numerical key(s) to the notes and references given in file 3 of the catalog.

2.4 Pulsar Notes and References (File 3 of 5)

This file is a simple text file containing notes and references concerning individual pulsars contained in file 2. The information is keyed by the numbers given in the last column of the data file (bytes 48-50).

Byte(s)	Fortran Format	Data
1-76	A76	Mixed case text

Table 4. Pulsar Notes File Record Format

2.5 Data for Other Sources (File 4 of 5)

This file contains data for miscellaneous other sources, such as supernova remnants, X-ray and binary X-ray, and miscellaneous sources. The data come from the papers of Fichtel *et al.* (1975), Thompson *et al.* (1977a), and Fichtel, Thompson, and Lamb (1987). The file has not been uniformly formatted because of the inhomogeneity of the information given; thus, it is a simple text file with column headings.

Byte(s)	Fortran Format	Data
1-75	A75	Other data in free form

Table 5. Other Data File Record Format

2.6 Other Notes and References (File 5 of 5)

This text file contains definitions of source types, notes, and references associated with the other sources data file. The notes and references are keyed by numbers given in the data file.

Byte(s)	Fortran Format	Data
1-70	A70	Mixed case text

Table 6. Other Notes File Record Format

3.0 History

3.1 Remarks

The machine-readable galaxies and pulsars data files of the *Catalog of SAS-2 Gamma-Ray Observations* were initially produced at the Astronomical Data Center from published papers supplied by Drs. Carl E. Fichtel and David L. Bertsch of the Laboratory for High Energy Astrophysics (LHEA) at the NASA Goddard Space Flight Center (GSFC), following a meeting with them in April 1988 that was arranged by Dr. J. M. Mead of GSFC. The newly created files were supplied to Dr. Stanley D. Hunter, also of the LHEA, who updated and added data to the existing files as well as creating the files for other sources. Further modifications were made in consultation with the above-mentioned authors.

3.2 Acknowledgments

Appreciation is expressed to Drs. Fichtel, Bertsch, and Hunter for their help with the design of the catalog and consultation during its preparation. Dr. Hunter kindly assembled and supplied reprints and photocopies of all the relevant published papers.

3.3 References

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Thompson, D. J., Fichtel, C. E., Kniffen, D. A., and Ögelman, H. B. 1977 b, *Astrophys. J. (Letters)* 200, L17-L18.

Appendix A. Sample Listing

The sample listing given on the following pages shows logical records exactly as they are recorded in the machine-readable version of the catalog. Groups of records from the beginning and end of each file are illustrated, except where the files are very short, in which case an entire file may be shown. The beginning of each record and the bytes within the record are indicated by the column heading index across the top of each page (digits read vertically).

LISTING OF RECORDS FROM DATA FILE

Data File Name: SAS-2 Galaxy Data

Records 1 to 20

Data File 226

Record Length 60 bytes

Input VOLSER ADC007

C O L U M N
H E A D I N G
I N D E X

11111111112222222222333333333344444444445555555555666666666677777777778888888888999999
12345678901234567890123456789012345678901234567890123456789012345678901234567890123

Record	1	Fairall 9	S	1.333	-59.1	1.8E-06	2.0E-06	6.1E+45
Record	2	3C 120	S	1.500	+ 5.3	2.4E-06	1.7E-06	2.7E+45
Record	3	AKn 120	S	5.233	- 0.2	1.8E-06	1.5E-06	2.3E+45
Record	4	MCG+08-11-011	S	5.303	+46.6	1.4E-06	1.9E-06	1.1E+45
Record	5	NGC 3227	S	10.350	+20.1	1.6E-06	8.9E-07	1.4E+43
10 Record	6	NGC 3783	S	11.617	-37.5	10.8E-06	3.1E-06	3.7E+44
Record	7	NGC 4051	S	12.000	+44.8	2.3E-06	1.9E-06	1.5E+43
Record	8	NGC 4151	S	12.133	+39.7	2.9E-06	7.3E-07	1.1E+43
Record	9	IC 4329 A	S	13.767	-30.0	2.1E-06	1.2E-06	3.3E+44
Record	10	MKN 279	S	13.867	+69.6	2.2E-06	1.2E-06	1.6E+44
Record	11	NGC 5548	S	14.250	+25.5	2.2E-06	1.4E-06	5.6E+44
Record	12	NGC 6814	S	19.667	-10.4	6.3E-06	1.3E-06	5.2E+43
Record	13	MKN 509	S	20.700	-10.9	3.0E-06	2.1E-06	3.8E+45
Record	14	3C 111	N	4.250	+37.9	5.4E-06	1.7E-06	5.7E+45
Record	15	3C 382	N	18.550	+30.4	7.5E-06	8.2E-07	4.0E+45
Record	16	3C 445	N	20.350	- 2.3	3.7E-06	2.0E-06	9.2E+45
Record	17	PKS 0548-322	B	5.800	-32.2	7.0E-06	2.9E-06	2.0E+46
Record	18	MKN 421	B	11.017	+38.4	3.5E-06	7.8E-07	1.1E+45
Record	19	MKN 501	B	16.867	+39.8	7.4E-06	4.1E-06	6.8E+45
Record	20	BL Lac	B	22.000	+42.0	2.3E-06	2.0E-06	1.3E+46

L I S T I N G O F R E C O R D S F R O M D A T A F I L E

Data File Name: SAS-2 Galaxy Data

Records 13 to 32

Data File 226

Record Length 60 bytes

Input VOLSER ADC007

C O L U M N
H E A D I N G
I N D E X

111111111122222222223333333333444444444455555555556666666666777777777788888888889999
12345678901234567890123456789012345678901234567890123456789012345678901234567890123

Record	13	MKN 509	S	20.700	-10.9	3.0E-06	2.1E-06	3.8E+45
Record	14	3C 111	N	4.250	+37.9	5.4E-06	1.7E-06	5.7E+45
Record	15	3C 382	N	18.550	+30.4	7.5E-06	8.2E-07	4.0E+45
Record	16	3C 445	N	20.350	- 2.3	3.7E-06	2.0E-06	9.2E+45
Record	17	PKS 0548-322	B	5.800	-32.2	7.0E-06	2.9E-06	2.0E+46
Record	18	MKN 421	B	11.017	+38.4	3.5E-06	7.8E-07	1.1E+45
Record	19	MKN 501	B	16.867	+39.8	7.4E-06	4.1E-06	6.8E+45
Record	20	BL Lac	B	22.000	+42.0	2.3E-06	2.0E-06	1.3E+46
Record	21	4U 0241+61	Q	2.683	+62.3	2.1E-06	3.5E-06	9.7E+45
Record	22	3C 273	Q	12.450	+ 2.2	2.8E-06	1.6E-06	5.7E+46
Record	23	NGC 2110	E	5.833	- 7.5	5.3E-06	2.2E-06	1.6E+44
Record	24	NGC 2992	E	9.717	-14.1	2.3E-06	5.3E-07	4.0E+43
Record	25	A 0945-30	E	9.750	-30.7	2.8E-06	1.4E-06	1.4E+44
Record	26	NGC 3034(M82)	E	9.983	+70.0	9.7E-06	5.0E-06	3.5E+42
Record	27	NGC 5506	E	14.167	- 2.9	2.7E-06	1.5E-06	7.2E+43
Record	28	M 31	O	0.683	+41.0		1.4E-06	
Record	29	SMC	O	0.917	-72.0		1.0E-06	
Record	30	LMC	O	5.333	-69.5		2.4E-06	
Record	31	M 87	O	12.467	+12.7	1.1E-06	6.4E-07	1.5E+43
Record	32	Cen A	O	13.367	-42.7	6.4E-06	2.0E-06	2.9E+42

L I S T I N G O F R E C O R D S F R O M D A T A F I L E

Data File Name: SAS-2 Pulsar Data

Records **1 to** **20**

Data File 227

Record Length 50 bytes

Input VOLSER ADC007

C O L U M N N
H E A D I N G
I N D E X

111111111122222222223333333333444444444455555555556666666666777777777788888888889999999999
12345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012

Record	1	0105+65	1.284	12.4	1.0	1.8	37.20	1
Record	2	0136+57	0.2724	10.687	2.50	2.2	38.1	2
Record	3	0138+59	1.223	0.2	3.0	1.6	38.11	1
Record	4	0154+61	2.3517	188.990	1.60	2.6	37.8	2,3
Record	5	0450-18	0.549	5.78	2.4	0.6	37.49	1
Record	6	0525+21	3.745	40.06	1.9	1.2	37.59	2
Record	7	0531+21	0.0331	442.439	2.0	3.7	38.34	9
Record	8	0540+23	0.246	15.43	2.8	1.0	37.85	1
Record	9	0611+22	0.335	59.73	3.5	1.2	38.11	1
Record	10	0628-28	1.244	2.51	1.4	1.1	37.28	1
Record	11	0656+14	0.3849	1.600	0.40	3.6	36.7	2
Record	12	0727-18	0.5102	18.948	1.50	1.4	37.5	2
Record	13	0740-28	0.1668	16.832	1.50	1.0	37.3	2,3
Record	14	0743-53	0.2148	2.730	2.40	4.0	38.5	2
Record	15	0818-13	1.238	2.11	1.6	1.0	37.36	1
Record	16	0833-45	0.0892	124.687	0.50	29.5	37.67	10
Record	17	0834+06	1.274	6.80	0.48	1.3	36.43	1
Record	18	0919+06	0.4306	13.725	1.00	1.4	37.1	2
Record	19	0922-52	0.7463	35.477	2.70	2.5	38.2	2
Record	20	0940-55	0.6644	22.739	4.90	3.0	38.8	2

LISTING OF RECORDS FROM DATA FILE

Data File Name: SAS-2 Pulsar Data

Records 94 to 113

Data File 227

Record Length 50 bytes

Input VOLSER ADC007

C O L U M N
H E A D I N G
I N D E X

111111111122222222223333333333444444444555555555566666666667777777777888888888899999
12345678901234567890123456789012345678901234567890123456789012345678901234567890123

Record	94	1944+17	0.441	0.024	0.55	1.6	36.64	1
Record	95	1946+35	0.717	7.05	5.4	2.1	38.74	1
Record	96	1951+32	0.039	5.9	2.0	3.7	38.15	11
Record	97	1952+29	0.427	0.003	0.67	1.6	36.81	1
Record	98	2002+31	2.111	74.58	7.8	2.0	39.04	1
Record	99	2016+28	0.558	0.15	0.48	1.8	36.57	1
Record	100	2020+28	0.343	1.90	2.0	2.0	37.86	1
Record	101	2021+51	0.529	3.04	0.8	1.7	36.99	1
Record	102	2045-16	1.962	10.97	0.43	1.5	36.40	1
Record	103	2106+44	0.415	0.1	0.78	1.7	36.97	1
Record	104	2111+46	1.015	0.72	4.0	1.5	38.34	1
Record	105	2148+63	0.380	0.16	0.84	1.7	37.04	1
Record	106	2154+40	1.525	2.9	3.2	1.6	38.18	1
Record	107	2217+47	0.538	2.76	1.6	1.0	37.36	1
Record	108	2223+65	0.683	9.5	0.73	1.2	36.76	1
Record	109	2255+58	0.368	5.75	2.1	1.4	37.75	1
Record	110	2305+55	0.475	0.1	1.6	1.0	37.36	1
Record	111	2319+60	2.256	7.6	2.5	1.4	37.90	1
Record	112	2324+60	0.234	0.36	0.76	1.5	36.89	1
Record	113	2351+61	0.9448	16.226	2.50	1.5	38.0	2

LISTING OF RECORDS FROM DATA FILE

Data File Name: SAS-2 Pulsar Notes

Records 1 to 16

Data File 228

Record Length 76 bytes

Input VOLSER ADC007

C O L U M N
H E A D I N G
I N D E X

1111111111222222222233333333333444444444455555555556666666666777777777788888888889999
12345678901234567890123456789012345678901234567890123456789012345678901234567890123

Record	1	SAS-2 Pulsars
Record	2	Notes and References
Record	3	
Record	4	1. Ogelman, H.B., et al. Astrophys. J. 209, 584, (1976).
Record	5	2. Thompson, D.J, et al., Astron. Astrophys. 127, 220, (1983).
14 Record	6	3. Also appears on list of Ogelman et al., updated parameters.
Record	7	4. Distance uncertainty relatively large.
Record	8	5. Based on 10 bin phase plot.
Record	9	6. Upper limit based on search of periods around the nominal value.
Record	10	7. Binary pulsar.
Record	11	8. Uses parameters prior to the 1977 glitch (Manchester et al. 1978, Mon.
Record	12	Not. R. Astron. Soc. 184, 35P.
Record	13	9. Crab pulsar, positive result. Thompson et al., Astrophys. J., 213, 252
Record	14	(1977).
Record	15	10. Vela pulsar, positive result. Thompson et al., Astrophys. J., 214, 117
Record	16	(1977).

L I S T I N G O F R E C O R D S F R O M D A T A F I L E

Data File Name: SAS-2 Other Data

Records 19 to 38

Data File 229

Record Length 75 bytes

Input VOLSER ADC007

C O L U M N N G
H E A D I N G
I N D E X

111111111122222222223333333333444444444455555555556666666666777777777788888888889999999999
12345678901234567890123456789012345678901234567890123456789012345678901234567890123

Record	19 3U 2142+38, Cyg X-2	X	21.71	+38.09	1.2E-06	1
--------	------------------------	---	-------	--------	---------	---

Record 20

Record	21 Rho Oph	0	.	.	1.5E-06	1
--------	------------	---	---	---	---------	---

Record	22 Corona Austrina	0	.	.	1.5E-06	1
--------	--------------------	---	---	---	---------	---

Record	23 Jupiter	0	.	.	0.63E-06	1
--------	------------	---	---	---	----------	---

Record	24 G195+5	0	.	.	4.3+/-0.9E-06	3
--------	-----------	---	---	---	---------------	---

Record	25 A0535	0	.	.	2.0E-06	3
--------	----------	---	---	---	---------	---

Record 26

Record	27	Name	Type	R.A.	Dec	Observed	>100MeV	Notes
Record	28					periods	p/cm ² /s	

Record 29

Record	30 3U 0900-40. Vela XR-1 B	3.4d	1.0E-06	2
--------	----------------------------	------	---------	---

Record	31 3U 1700-37	B	.	.	283s, 9.0d	1.0E-06	2,4
--------	---------------	---	---	---	------------	---------	-----

Record	32 Her X-1	B	.	.	1.2s, 1.7d 35.0d	0.5E-06	2
--------	------------	---	---	---	------------------	---------	---

Record	33 SNC X-1	B	.	0.7s, 3.9d	0.7E-06	2
--------	------------	---	---	------------	---------	---

Record	34 Cen X-3	B	.	4.8s, 2.1d	2.5E-06	2,5
--------	------------	---	---	------------	---------	-----

Record	35 Cvg X-1	B	5.6d	1.1E-06	2
--------	------------	---	------	---------	---

Record	36 Sco X-1	B	.	.	0.8d	1.0E-06	1,2
--------	------------	---	---	---	------	---------	-----

Record	37 Cya X-2	B	.	.	13.6d	1.2E-06	1.2
--------	------------	---	---	---	-------	---------	-----

Record	38 Cya X-3	B	.	.	4.8d	4.4+/-1.1E-06	2
--------	------------	---	---	---	------	---------------	---

L I S T I N G O F R E C O R D S F R O M D A T A F I L E

Data File Name: SAS-2 Other Notes

Records 1 to 15

Data File 230

Record Length 70 bytes

Input VOLSER ADC007

C O L U M N
H E A D I N G
I M D E X

111111111122222222223333333333444444444455555555556666666666777777777788888888889999
12345678901234567890123456789012345678901234567890123456789012345678901234567890123

Record	1	SAS-2 Other Sources
Record	2	Notes and references
Record	3	
Record	4	Types:
Record	5	S - Supernova Remnants
Record	6	X - X-ray Sources
Record	7	O - Other Sources
Record	8	B - Binary X-ray Sources
Record	9	
Record	10	1. Fichtel, C.E., et. al., (1975).
Record	11	2. Lamb, et. al., (1976).
Record	12	3. Thompson, D.J., et. al., Atrophys. J. 213, 252 (1977).
Record	13	4. The flux limit applies to the 9.0d period.
Record	14	5. The relatively high limit is due to the source being near the edge
Record	15	of the field of view and in the galactic plane (from note 2).



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National Aeronautics and
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Goddard Space Flight Center
Greenbelt, Maryland 20771

RECORD COUNT OF TAPE GMRD1

INPUT TAPE GMRD1 ON HTJ

FILE	INPUT RECS.	DATA RECORDS INPUT	MAX. SIZE	READ ERROR SUMMARY				INPUT RETRIES	
				PERM	ZERO 3	SH CRT	UNDEF.	# RECS.	TOTAL#
1	1	1	1920	0	0	0	0	0	0
2	1	1	5650	0	0	0	0	0	0
3	1	1	1216	0	0	0	0	0	0
4	1	1	2850	0	0	0	0	0	0
5	1	1	1050	0	0	0	0	0	0

DOUBLE END OF FILE READ AFTER FILE 5 # OF PERMANENT READ ERRORS 0

START TIME 09/24/90 06:57:57 STOP TIME 09/24/90 06:58:08

GMRA1
DUPE AND COMPARE OF ~~GMDA1~~ ONTO DMRC1

INPUT TAPE GMDA1 ON HT0 ST
OUTPUT TAPE DMRC1 ON HT1

DATA INPUT DAC 5
OPTIONS USED: DUPE AND COMPARE # FILES 5 ERRORS/TAPE 10 DUMP

FILE	INPUT RECS.	DATA RECORDS		MAX. SIZE	READ ERROR SUMMARY				INPUT RETRIES		WRITE ERRORS		OUPUT RETRIES	
		INPUT	OUTPUT		PERM	ZERO B	SHORT	UNDEF.	#RECS.	TOTAL#	PERM	UNDEF.	#RECS.	TOTAL#
1	1	1	1	1920	0	0	0	0	0	0	0	0	0	0
2	1	1	1	5650	0	0	0	0	0	0	0	0	0	0
3	1	1	1	1216	0	0	0	0	0	0	0	0	0	0
4	1	1	1	2850	0	0	0	0	0	0	0	0	0	0
5	1	1	1	1050	0	0	0	0	0	0	0	0	0	0

DUPE OF GMDA1 ONTO DMRC1 COMPLETED, # FILES COPIED 5 # PERMANENT READ ERRORS 0 # OUTPUT TAPES 1

TAPE	FILE	INPUT RECS.	DATA RECORDS		MAX. SIZE	READ ERROR SUMMARY				INPUT RETRIES	
			INPUT	OUTPUT		PERM	ZERO B	SHORT	UNDEF.	#RECS.	TOTAL#
GMDA1	1	1	1	1	1920	0	0	0	0	0	0
DMRC1	1	1	1	1	1920	0	0	0	0	0	0
GMDA1	2	1	1	1	5650	0	0	0	0	0	0
DMRC1	2	1	1	1	5650	0	0	0	0	0	0
GMDA1	3	1	1	1	1216	0	0	0	0	0	0
DMRC1	3	1	1	1	1216	0	0	0	0	0	0
GMDA1	4	1	1	1	2850	0	0	0	0	0	0
DMRC1	4	1	1	1	2850	0	0	0	0	0	0
GMDA1	5	1	1	1	1050	0	0	0	0	0	0
DMRC1	5	1	1	1	1050	0	0	0	0	0	0

JOB COMPLETED, # FILES COMPARED 5

START TIME 09/24/90 12:50:39 STOP TIME 09/24/90 12:51:08

\$\$
\$ASS IN HT1
\$EXE TPDUMP BS

```

$REW IN
$ASS IN HT1
$NOP
$NOP
$NOP
$NOP ***** GMRC1 *****
$EXE IPLIST BS

```

INPUT PARAMETERS ARE: ED AL 5 1 1

```

TAPE NO. 1 FILE NO. 1
RECORD 1 LENGTH 1920
Fairall 9 S 1.333 -59.1 1.8E-06 2.0E-06 6.1E+453C 120 S 1.500 +5.3 2.4E-0
6 1.7E-06 2.7E+45AkN 120 S 5.233 -0.2 1.8E-06 1.5E-06 2.3E+45MG+08-11-011 S
5.303 +46.6 1.4E-06 1.9E-06 1.1E+45NGC 3227 S 10.350 +20.1 1.6E-06 8.9E-07 1.4E
+43NGC 3783 S 11.617 -37.5 10.8E-06 3.1E-06 3.7E+44NGC 4051 S 12.000 +44.8 2.3
E-06 1.9E-06 1.5E+43NGC 4151 S 12.133 +39.7 2.9E-06 7.3E-07 1.1E+43IC 4329 A S
13.767 -30.0 2.1E-06 1.2E-06 3.3E+44MKN 279 S 13.867 +69.6 2.2E-06 1.2E-06 1
.6E+44NGC 5548 S 14.250 +25.5 2.2E-06 1.4E-06 5.6E+44NGC 6814 S 19.667 -10.4
6.3E-06 1.3E-06 5.2E+43MKN 509 S 20.700 -10.9 3.0E-06 2.1E-06 3.8E+453C 111
N 4.250 +37.9 5.4E-06 1.7E-06 5.7E+453C 382 N 18.550 +38.4 7.5E-06 8.2E-07
4.0E+453C 445 N 20.350 -2.3 3.7E-06 2.0E-06 9.2E+45PKS 0548-322 B 5.800 -32.2
7.0E-06 2.9E-06 2.0E+46MKN 421 B 11.017 +38.4 3.5E-06 7.8E-07 1.1E+45MKN 501
B 16.867 +39.8 7.4E-06 4.1E-06 6.8E+45BL Lac B 22.000 +42.0 2.3E-06 2.0E-
06 1.3E+464U 0241+61 Q 2.683 +62.3 2.1E-06 3.5E-06 9.7E+453C 273 Q 12.450 +
2.2 2.8E-06 1.6E-06 5.7E+46NGC 2110 E 5.833 -7.5 5.3E-06 2.2E-06 1.6E+44NGC 29
92 F 9.717 -14.1 2.3E-06 5.3E-07 4.0E+43A 0945-30 E 9.750 -30.7 2.8E-06 1.
4E-06 1.4E+44NGC 3134(M82) E 9.983 +70.0 9.7E-06 5.1E-06 3.5E+42NGC 5506 E 14.167
-2.9 2.7E-06 1.5E-06 7.2E+43M 31 0 0.683 +41.0 1.4E-06 SMC
0 0.917 -72.0 1.0E-06 LMC 0 5.333 -69.5
2.4E-06 M 87 0 12.467 +12.7 1.1E-06 6.4E-07 1.5E+43Gen A 0 13.3
67 -42.7 6.4E-06 2.0E-06 2.9E+42

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TAPE NO. 1 FILE NO. 2
RECORD 1 LENGTH 5650
0105+65 1.284 12.4 1.0 1.8 37.20 1 0136+57 0.2724 10.687 2.50 2.2 38.1 2
0138+59 1.223 0.2 3.0 1.6 38.11 1 0154+61 2.3517 188.990 1.60 2.6 37.8 2
.30450-18 0.549 5.78 2.4 0.6 37.49 1 0525+21 3.745 40.06 1.9 1.2 37.59
2 0531+21 0.0331 442.439 2.0 3.7 38.34 9 0540+23 0.246 15.43 2.8 1.0 37.85
1 0611+22 0.335 59.73 3.5 1.2 38.11 1 0628-28 1.244 2.51 1.4 1.1 37.28
1 0656+14 0.3849 1.600 0.40 3.6 36.7 2 0727-18 0.5102 18.948 1.50 1.4 37.5
2 0740-28 0.1968 16.832 1.50 1.0 37.3 2,30743-53 0.2148 2.730 2.40 4.0 38.
5 2 0818-13 1.238 2.11 1.6 1.0 37.36 1 0833-45 0.0892 124.687 0.50 29.5 37
.67 10 0834+06 1.274 6.80 0.48 1.3 36.43 1 0919+06 0.4306 13.725 1.00 1.4 3
7.1 2 0922-52 0.7463 35.477 2.70 2.5 38.2 2 0940-55 0.6644 22.739 4.90 3.6
38.8 2 0941-56 0.8081 39.617 4.90 3.2 38.9 2 0943+10 1.098 3.53 0.63 1.0
36.56 1 0950+08 0.253 0.23 0.10 1.1 35.00 1 0959-54 1.4366 51.665 3.30 2.9
38.5 2 1001-47 0.3071 22.074 1.60 3.7 38.0 2 1055-52 0.1971 5.834 0.92 4.
3 37.6 2 1112+50 1.656 2.6 0.31 1.7 36.18 1 1133+16 1.188 3.73 0.18 0
.8 35.36 1 1133-55 0.3647 8.228 2.90 6.2 38.7 2 1237+25 1.382 0.96 0.37
0.7 35.93 1 1323-62 0.5299 18.890 7.90 16.0 40.0 2 1356-60 0.1275 6.339 8.80
5.3 39.6 2 1358-63 0.8428 16.915 2.90 6.7 38.7 2 1508+55 0.740 5.04 0.92
1.4 36.04 1 1509-58 0.1502 1520.0 4.20 9.1 39.2 2 1541+09 0.748 0.41 2.5
1.0 37.75 1 1552-23 0.5326 0.700 1.80 3.0 38.0 2,51552-31 0.5181 0.050 2.6
0 2.2 38.2 2,51555-55 0.9572 20.479 6.30 3.2 39.1 2 1557-50 0.1926 5.063 7.
80 5.1 39.5 2 1558-50 0.8642 69.572 2.50 4.3 38.4 2 1600-27 0.7783 2.920 1
.60 1.5 37.6 2 1604-50 0.422 0.31 0.4 0.9 36.11 1 1641-45 0.4551 20.137
5.30 2.4 38.8 2,81642-03 0.388 1.78 0.16 0.9 35.32 1 1648-17 0.9734 3.042
1.10 0.9 37.1 2,41700-32 1.212 0.7 0.47 1.8 36.56 1 1702-18 0.2990 4.140
0.74 3.1 37.2 2,41706-16 0.653 6.37 0.16 1.1 35.54 1 1707-53 0.8992 15.45
4 3.60 2.3 38.5 2 1717-29 0.620 0.8 1.6 2.2 37.71 1 1718-32 0.477 0.7
4.4 2.4 38.62 1 1719-37 0.2362 10.816 2.50 1.3 37.9 2,31727-47 0.8297 163.
672 4.10 2.2 38.6 2,31729-41 0.6280 12.838 6.10 1.7 38.8 2 1730-22 0.872 0

```

0.0	1.6	1.5	37.54	1	1742-39	0.367	11.7	2.9	2.5	38.28	1	1747-46	0.7424			
1.295	0.66	2.3	37.0	3	1749-28	0.563	8.15	1.7	2.4	37.79	1	1813-26	0.593			
0.3	3.5	1.4	38.19	1	1818-04	0.5981	6.338	1.50	3.5	37.9	3	1819-22	1.874			
0.6	5.7	2.3	38.83	1	1821-19	0.1893	5.238	6.80	2.1	39.0	2	1822-09	0.7690			
52.329	0.56	2.1	36.8	3	1826-17	0.307	5.59	8.8	1.8	39.11	1	1831-33	0.687			
41.5	9.4	3.0	39.38	1	1831-34	0.290	0.1	2.3	3.8	38.26	1	1834-10	0.5627			
11.775	8.90	1.5	39.1	2	1845-04	0.598	51.9	4.9	3.6	38.89	1	1845-01	0.659			
5.2	5.4	3.1	38.91	1	1846-06	1.451	45.7	5.7	3.6	39.04	1	1857-26	0.612			
1.16	1.4	1.9	37.20	1	1859-03	0.655	7.50	15.0	1.2	39.38	1	1900-05	0.74			
66	12.896	4.20	11.0	39.3	2	1910-06	0.432	3.4	9.0	3.6	39.41	1	1900-01	0.7		
29	4.12	8.8	2.9	39.30	1	1907-00	1.017	5.4	4.3	3.1	38.72	1	1907-02	0.		
495	2.76	7.5	3.6	39.26	1	1907-10	0.284	2.69	5.0	4.9	39.04	1	1910-20	2		
.233	9.5	3.2	3.9	38.56	1	1911-04	0.826	4.06	3.7	2.1	38.41	1	1913-16			
0.6590	0.009	5.20	2.2	38.9	7	1915-13	0.195	7.20	3.2	2.1	38.28	1	1916-14			
1.1809	211.40	0.76	3.2	37.3	2,51917+09	1.272	7.67	3.4	1.0	38.00	1	1919-19				
0.821	0.8	5.3	1.3	38.52	1	1919-21	1.337	1.35	0.42	1.3	36.32	1	1920-2			
1	1.378	8.2	9.2	2.7	39.32	1	1924-16	0.5798	18.004	4.30	1.8	38.5	2	1927+		
13	1.7620	3.661	6.40	3.8	39.2	2,51923+10	0.227	1.16	0.11	1.6	36.23	1	1930			
+22	0.1444	57.780	7.00	3.9	39.3	2	1933-16	0.359	6.00	6.0	1.7	38.74	1	194		
4+17	0.441	0.924	0.55	1.6	36.64	1	1946+35	0.717	7.05	5.4	2.1	38.74	1	19		
51+32	0.039	5.9	2.0	3.7	38.15	11	1952+29	0.427	0.003	0.67	1.6	36.81	1	2		
002+31	2.111	74.58	7.8	2.0	39.04	1	2016+28	0.558	0.15	0.48	1.8	36.57	1			
2020+28	0.343	1.90	2.0	2.0	37.86	1	2021+51	0.529	3.04	0.8	1.7	36.99	1			
2045-16	1.962	10.97	0.43	1.5	36.40	1	2106+44	1.415	0.1	0.78	1.7	36.97	1			
2111+46	1.015	0.72	4.0	1.5	38.34	1	2148+63	0.380	0.16	0.84	1.7	37.04				
1	2154+40	1.525	2.9	3.2	1.6	38.18	1	2217+47	0.538	2.76	1.6	1.0	37.36			
1	2223+65	0.683	9.5	0.73	1.2	36.76	1	2255+58	0.368	5.75	2.1	1.4	37.75			
1	2315+55	0.475	0.1	1.6	1.0	37.36	1	2319+60	2.256	7.6	2.5	1.4	37.9			
0	1	2324+60	0.234	0.36	0.76	1.5	36.89	1	2351+61	0.9448	16.226	2.50	1.5	38.		

TAPE NO. 1

FILE NO. 3

RECORD 1

LENGTH 1216

SAS-2 Pulsars

tes and References

No

1. Ogelman, H.B., et al. *Astrophys. J.* 209, 584, (1976).
2. Thompson, D.J, et al., *Astron. Astrophys.* 127, 220, (1983).
3. Also appear s on list of Ogelman et al., updated parameters.
4. Distance uncertainty relatively large.
5. Based on 10 bin phase plot.
6. Upper limit based on search of periods around the nominal value.
7. Bina ry pulsar.
8. Uses parameters prior to th e 1977 glitch (Manchester et al. 1978, Mon. Not. R. Astron. Soc. 184, 35P.
9. Crab pulsar, positive result. Thompson et al., *Astrophys. J.*, 213, 252 (1977).
10. Vela pulsar, positiv e result. Thompson et al., *Astrophys. J.*, 214, L17 (1977).

TAPE NO. 1

FILE NO. 4

RECORD 1

LENGTH 2850

SAS-2 Other Sources

Name

Type
p/cm²/s

R.A.

Dec

>100 MeV

Notes

S	.	2.4E-06	1	Monoceros Loop	S	.	Lupus Loop	.	4.4E
-06	1			Cas A	S	.	1.1E-06	1	
				Cygnus Loop	S	.	1.4E-06	1	HB 21
S	.	1.2E-06	1	CTA 1	S	.			1
.1E-06	1			Tycho's SNR, 3C 10	S	.	1.1E-06	1	
X-1	X	16.28	-15.54	0.95E-05	1		3U 1728-24, GX 1+4	X	17.48 -24.72
4.0E-16	1			3U 1744-26, GX 3+1	X	17.74	-26.55	2.8E-06	1
				3U 1758-25, GX 5-1	X	17.97	-25.08	2.9E-06	1
Cyg X-1	X	19.94	+35.06	2.7E-06	1		3U 1956+31,		
.09	1.2E-06	1					3U 2142+38, Cyg X-2	X	21.71 +38
				Rho Oph	0	.	1.5E-06	1	Corona Au
strina	0	.		1.5E-06	1		Jupiter	0	

0.63E-06 1 A0535 0 619E+5 0 4.3+/-0.9E-06 3
 2.0E-06 3

Dec	Observed	>100 MeV	Notes	Name	Type	R.A.
0900-40	Vela XR-1 B	3.4d	1.0E-06 2	3U 1700-37	B	3U
283s, 9.0d	1.0E-06 2,4	Her X-1	B	1.2s, 1.7d		
35.0d 0.5E-06 2	SMC X-1	B	0.7s, 3.9d	0.7E-06 2		
Cen X-3	B	4.8s, 2.1d	2.5E-06 2,5	Cyg X-1	B	
5.6d	1.1E-06 2	Sco X-1	B	0.8d		
1.0E-06 1,2	Cyg X-2	B	13.6d	1.2E-06 1,2		
Cyg X-3	B	4.8d	4.4+/-1.1E-06 2			

TAPE NO. 1 FILE NO. 5
 RECORD 1 LENGTH 1050
 SAS-2 Other Sources

d references

Types:

mnants

0 - Other Sources

X - X-ray Sources

S - Supernova Re

B -

Binary X-ray Sources

1. Fichtel, C.E., et. al., (1975).

2. Lamb, et. al., (1976).

3. Thompson, D.J., et

al., Astrophys. J. 213, 252 (1977).

4. The flux limit applies to the 9.0d period.

5. The relatively high limit is due to the source being near the edge of the field of view and in the galactic plane (from note 2).

***** JOB DONE.

\$WE0 LPS

\$\$

\$ASS IN HT0

\$EXE TPDUMP BS