

#255

OSO-4

RASTER SCAN

BACKGROUND RASTER SCAN DATA

67-100A-08A

67-100A-08B

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 This inventory information is now no longer maintained in the DSCs, but is now managed in the inventory part of the NSSDC information system.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

REQ. AGENT

RAND NO.

ACQ. AGENT

OSO-4

RASTER SCAN & BACKGROUND RASTER SCAN DATA

67-100A-08A

67-100A-08B

This data set has been restored. The DR and DS tape are 9 track, binary and multi-filed. The DR tape is a 3480 cartridge and the DS tape is 6250 BPI. The DR, DS, and DD numbers along with the time spans are given as follows:

67-100A-08A

RAW RASTERS

DR #	DS #	DD #	FILES	TIME SPAN
-----	-----	-----	-----	-----
DR02911	DS02911	D-02853	1	10/19/67 - 11/15/67
		D-02854	2	11/15/67 - 11/28/67
		D-02855	3	11/28/67 - 12/18/67
		D-04870	4	12/24/67 - 02/03/68
		D-04871	5	01/29/68 - 02/28/68
		D-04872	6	03/07/68 - 04/18/68
		D-04873	7	04/08/68 - 05/12/68

67-100A-08B

BACKGROUND RASTERS

DR #	DS #	DD #	FILES	TIME SPAN
-----	-----	-----	-----	-----
DR02912	DS02912	D-02856	1	10/25/67 - 12/18/67
		D-04874	2	04/08/68 - 05/12/68

RASTER SCAN & BACKGROUND RASTER SCAN DATA

67-100A-08A

67-100A-08B

This data set catalog consists of 7 OSO-4 Raster Scan (08A) and 2 Background Raster Scan (08B) tapes. They are 800 BPI, Binary, created on an IBM 360 computer. The 'D' tapes are 9-track and the 'C' tapes are 7-track. The tapes contain one file of data each.

67-100A-08A

RAW RASTERS

<u>D#</u>	<u>C#</u>	<u>START</u>	<u>STOP</u>
D-04870	C-09429	12/24/67	2/03/68
D-04871	C-09430	1/29/68	2/28/68
D-04872	C-09431	3/07/68	4/18/68
D-04873	C-09432	4/08/68	5/12/68
D-02853	C-02174	10/20/67	11/15/67
D-02854	C-02175	11/15/67	11/28/67
D-02855	C-02176	11/28/67	12/18/67

67-100A-08B

BACKGROUND RASTERS

<u>D#</u>	<u>C#</u>	<u>START</u>	<u>STOP</u>
D-04874	C-09433	4/08/68	5/12/68
D-02856	C-02177	10/26/67	12/18/67

OUTPUT:

The output is in two forms. An on-line listing and an edited 7 track 556 BPI tape for printing.

HOW TO USE:

JCL CARDS

```
// Job Card          -5 min, 5 min
// Exec PL1, Parm='CHAR48'
//Source.SYSIN DD *,DCB=BLKSIZE=80
```

```
PL/1 Source
Deck
```

```
/*
```

```
// Exec Assembly
//Source.SYSIN DD *
```

For each Assembly
Language Program

```
Assembly Language
Deck
```

```
/*
```

```
// Exec Linkgo, REGION.Go=300k
```

```
Raw Raster // Go.RAWTAP DD UNIT=2400-9, Disp=(OLD,PASS), DSNAME=RAWTAP, *
Data Tape  // DCB=(RECFM=V, LRECL=3976, BLKSIZE=3980, DEN=2), *
           // LABEL=(2, BLP), VOLUME=SER=Z1409
Background //Go. INTAPE DD UNIT=2400-9, DISP=(OLD,PASS), DSNAME=TAPIN, *
Raster Data // DCB=(RECFM=V, LRECL=3880, BLKSIZE=3884, DEN=2), *
Tape        // LABEL=(2, BLP), VOLUME=SER=Z1263
Output      //Go. OUTAPE DD UNIT=2400-7, DISP=(NEW,PASS), DSNAME=OUTP. *
Tape        // DCB=(RECFM=V, LRECL=3976, BLKSIZE=3980, DEN=1, *
           // TRTCH=ET), LABEL=(, BLP), VOLUME=SER=1263
           //Go. PL1DUMP DD SYSOUT=A, SPACE=(CYL,(2,2)), DCB=RECFM= *
           // VBA, LRECL=137, BLKSIZE=7265)
           //Go.SYSIN DD *
```

INPUT CARD

Column

1-15 Start time for printout
16-30 Stop time for printout

Both times should be punched with decimal point; as days and fraction since January 0, 1967.

31 Print-all indicator

If non-blank, this indicator is set and all rasters within time limits (other than calibration rasters) are printed.

Raw Raster and Average Background Raster Data from the AS&E OSO-D Pointed X-ray Telescope

The AS&E OSO-D pointed x-ray telescope experiment has been described in detail by Giacconi et al. (1968). The output data consists of a 48 x 40 word array containing the counting rate of the photoemission-scintillation x-ray detector (counts/0.14 sec.) as a function of raster position. This is referred to as the "raw raster". In addition to solar x-rays, the raw raster counting rates contain background counts which are due to spacecraft generated noise which is a function of raster position, and energetic charged particle counts which depend upon spacecraft orbital position and time, but which are independent of raster position. In order to determine the counting rate due to solar x-rays as a function of raster position, one must subtract from the raw raster and "average background raster" which consists of the spacecraft generated noise and the average charged particle counting rate (excluding periods when the spacecraft is passing through the South Atlantic anomaly).

The average background raster is generated by subtracting the constant $\bar{N}_{cal}$ the counting rate due to the ^{55}Fe calibration source, from the "average calibration raster" generated by summation of all calibration rasters (excluding rasters obtained when the spacecraft was passing through the South Atlantic anomaly). The constant, $\bar{N}_{cal}$ proportional to x-ray detector efficiency, is determined by subtraction of the average counting rate in 40 raster positions where no solar x-rays are expected in the least sensitive mode of the experiment from average counting rate in the corresponding 40 positions of the average calibration raster.

An x-ray filtergram of the Sun is therefore obtained by a point by point subtraction of the appropriate average background raster from the raw raster.

Reference

Giacconi, R., Gursky, H., Paolini, F., and Rockwell, C.: 1968, "final Report for AS&E OSO=IV X-ray Pointed Telescope and Rotating X-ray Wheel Experiments" ASE-1921

Format of Raw Raster and Background Raster Tapes
From the AS&E Grazing Incidence X-ray Telescope
on the pointed Section of OSO-D

Both formats share the following properties:

1. They are written as standard IBM System/360 variable length, (type V) unblocked records.
2. They are written via programs coded in PL/I language, byte may be read from PL/I, assembly language, and COBOL (but not FORTRAN).
3. They are 9 track, 800 bits per inch, NRZI Mode.

If it is ever required to read these tape from FORTRAN, assembly language subroutines will have to be written. Note that if these tapes had been written using the standard FORTRAN-compatible format, they would have been 2 to 3 times as long. This is because FORTRAN uses short block lengths (less than 300 bytes), which makes for inefficient tape utilization, since most of the tape is then made up of inter-record gaps.

RAW RASTER TAPE

Each record has the same format.

TOTAL BLOCK LENGTH: 3980 including control bytes

RECORD LAYOUT (excludes TYPE V control bytes):

BYTES

- 1-8 Universal time of first word in raster array, below.
Given as days and fraction, since January 0, 1967. This is a System/360 double precision floating point number.
- 9-16 Universal time of first word is analog subcom #5 array, described below. Given as day and fraction, since January 0, 1967. This is a system/360 double precision floating point number.
- 17-20 Actual number of OSO-D words in raster. For a full, normal raster this will be 1920. Given as binary integer.
- 21-24 Number of OSO-D words in each of the Subcom arrays, described below. Given as binary integer.

25-28 Number of questionable data words in the raster; that is, the number that have the first, but not the second, flag bit set. Given as binary integer.

29-32 Number of unintelligible rasters skipped since the last raster on tape. Given as binary integer.

33-36 Number of missing data words in the raster; that is, the numbers that have the second flag bit set. Given as binary integer.

37-40 This is a binary integer that is ordinarily zero. Set to 1 if this raster is short due to Sunset. Set to 2 if this raster is short due to break in data.

41-44 This binary integer is always zero.

45-48 This binary integer indicates the filter wheel position.

- 1-Binary code 00, Mylar
- 2-Binary code 01, 1/2 mil beryllium
- 3-Binary code 10, calibration source
- 4-Binary code 11, 2 mil beryllium
- 5-Cannot determine

Filter wheel position is determined from the values in analog subcom #5 array.

49-52 This binary integer indicates the aperture wheel position:

- 1-Binary code 00, 40 mil, 4.0 arc minute diameter
- 2-Binary code 01, 10 mil, 1.0 arc minute diameter
- 3-Binary code 10, 10 mil, 1.0 arc minute diameter
- 4-Binary code 11, 40 mil, 4.0 arc minute diameter

Aperture wheel position is determined from the values in analog subcom #7 array.

The data words that follow are taken from the original telemetry tapes supplied by GSFC, and are given in their original form, including flag bits. Each data word occupies 16 bits, as follows:

1-6 Not used

7 Flag bit 1, if this bit, and not the next is set, then the data word is questionable.

8 Flag bit 2; if this bit is set, the data word is missing and should be ignored. If both flag bits are set, this data is filler at the end of the GSFC data file.

9-16 OSO-D 8 bit telemetry word, in its original form.

All 5 of these data arrays are fixed in length; that is, they each occupy a fixed number of bytes on the tape. The logical length is given in each case by one of the binary integers described above. If this logical length, n , is greater than the number of OSO-D words, m , allowed on the tape, then only m words appear, and the remainder are lost. If n is less than m , then only the first n words in the tape record are meaningful, and the remaining words should be ignored.

53-3892 These are the main frame raster words; they are given in the order in which they occurred in the telemetry (i.e., in the order in which the instrument scanned). The first four words should be all 1 bits, since they cover the period when the instrument is starting the new scan and is transmitting all 1 bits. Space is allowed for 1920 data words (a full raster). Logical length is given by integer in (17-20) above.

3893-3912 Sail Analog subcom #5 words (filter wheel).

3913-3932 Sail Analog subcom #7 words (a aperture wheel).

3933-3952 Sail analog subcom #27 words (Door status & -6v supply).

3953-3972 Sail Analog sub com #44 words (+2.4 KV monitor).

Note that all the analog subcom words were received during the time period from the first to the last raster word. They therefore pertain to the condition of the instrument during the raster scan. The logical length of each of these arrays is the same, and is given by the integer om (21-24) above. Note also that these words, since they are in their telemetered form, are not converted back to voltages.

BACKGROUND RASTER TAPE

Each record on this tape has the same format.

TOTAL BLOCK LENGTH: 3884, including control bytes.

RECORD LAYOUT (Excludes TYPE V control bytes):

1-4 $\underline{a}$ =estimated absolute efficiency of CsI photoemission-scintillation x-ray detector 2.1 Å x-rays.

5-6 Universal time of start of interval for which this background raster applies.

9-12 Universal time of end of interval to which this background raster applies.
Universal time gives day and fraction since January 0, 1967.

13-16 $\overline{N}_{cal}$ =average uniform count rate on raw calibration raster (emitted by FE^{55} calibration source)
$$\overline{N}_{cal} = N_{40}(cal) - N_{40}(1)$$

17-20 Δ_{cal} =statistical error in $\overline{N}_{cal}$

21-24 $\overline{N}_{cal}(cal)$ =average count rate of 40 positions along north and south edges of raw calibration rasters.

25-28 $\Delta_{40}(cal)$ =statistical error in $N_{40}(cal)$

29-32 $N(1)$ =average counting rate of 40 positions along north and south edges of raw, one arc minute aperture, 2 mil Be filter raster

31-36 $\Delta_{40}(1)$ =statistical error in $N_{40}(1)$

All the above quantities are given as System/360 single precision floating point words.

37- This is the background raster. It is always 1920 words long.

3876 The first four words are not very meaningful since they cover the period at the start of the scan where the instrument reads out all 1 bit. The words are given out by the telemetry. Each word occupies two bytes on the tape, and is given in decimal. Three decimal digits are given with one place after the decimal point. The order of words is identical to that on the raw raster tape.

NAME: OSO-D Corrected Raster Program GRST

PURPOSE: Generated corrected rasters for AS&E pointed solar x-ray experiments on board OSO-D

FUNCTIONAL DESCRIPTION:

The program reads as input:

- a) AS&E solar x-ray raw raster tape
- b) Corresponding AS&E solar x-ray background raster tape
- c) Input card

The input card gives start and stop time for printout, and indicator whether or not all corrected raster are to be printed.

The program reads each raw raster from the raw raster tape, skipping those that do not fall within the time limits specified, and also all calibration rasters. If the print-all indicator is set, then all remaining rasters within the time limits are printed. If it is not set, then every raster is printed that has at least seven OSO-D words such that

$$\bar{N}_i - B_i \leq 2\sqrt{B_i}$$

where $\bar{N}_i$ is the count rate determined from the OSO-D word.

B_i is the background count rate from the same position in the background raster.

For each raster that is printed, the following processing is done:

- 1) Filter wheel and aperture wheel positions are determined from the raw raster tape and printed.
- 2) $\bar{N}_{tot}$ and ϵ are printed
- 3) Subcom voltages are printed
- 4) The corrected raster is printed.
- 5) For each OSO-D word the following algorithm is used:
 $N_{ci} = \bar{N}_i - B_i$ (N_{ci} is corrected count rate, $\bar{N}_i$ and B_i are as above)

If N_{ci} is less than 1.0, print "--"

if print-all indicator is not set and $N_{ci} < 2\sqrt{B_i}$
then print "--"

Print 2 digits: n.n, giving $\log_2 N_{ci}$

If $\log_2 N_{ci} \geq 10$, the first digit is printed as A=10 B=11, etc.

If the raster word is missing (flag bit 2 set) print "++"

If the raster is short (<1920 words) and the word is beyond the end, print"=="

498
365
133
may 12, 1988

FILE	7	RECORD	INPUT	DATA RECORDS	MAX.	SIZE	PERM	ZERO	B	SHORT	UNDEF.	#RECS.	TOTAL#
			2762	2762	3982								
FILE	7	RECORD	INPUT	DATA RECORDS	MAX.	SIZE	PERM	ZERO	B	SHORT	UNDEF. <td>#RECS.</td> <td>TOTAL#</td>	#RECS.	TOTAL#
(236)	485	5592	47F0C428	58510348	78621001	22664789	01404720	CU389640	05222066	43902000	5490C580		
(236)	485	5592	47F0C428	58510348	78621001	22664789	01404720	CU389640	05222066	43902000	5490C580		
(240)	485	5592	47F0C428	58510348	78621001	22664789	01404720	CU389640	05222066	43902000	5490C580		
(240)	485	5592	47F0C428	58510348	78621001	22664789	01404720	CU389640	05222066	43902000	5490C580		
(244)	478	6048	6060C568	4890C596	47F0C0A8	6060C570	4A90C596	43A0C593	9180C558	4780C560	6960C550		
(248)	478	6048	6060C568	4890C596	47F0C0A8	6060C570	4A90C596	43A0C593	9180C558	4780C560	6960C550		
(252)	472	6118	49A0C59E	4720C0F4	94EFC552	89A0C003	646AC0D4	4AA0C550	4740C150	9610C552	49A0C59C		
(252)	472	6118	49A0C59E	4720C0F4	94EFC552	89A0C003	646AC0D4	4AA0C550	4740C150	9610C552	49A0C59C		
(256)	575	6518	98ABC518	80AF0318	910C5518	4710C120	8CA00004	4EA0C4C8	94F0C4C5	9110C552	4780C14A		
(260)	888	7011	5CA0C58C	4EA0C4E0	47F0C150	9620C552	159947F0	C1501BAA	50A0C4E0	1B66436C	50U118B6		
(264)	188	7912	55224781	48E1C596	47F0C174	48B0C5A0	4740C250	19A0472C	4180C4C3	18D0B06D	12AA4740		
(268)	924	8877	9120C552	4710C2A4	F3A0C4C3	4C0BF374	4AD4C4E3	96F0C4D8	4180C4C3	18D0B06D	12AA4740		
(272)	41A0C18A	19BA12A	4720C1E0	19D34740	C1BE92F0	09009140	C5524780	C1DE1903	4740C290	12AA4720	C1FA1AA7		
(276)	C1DA19D3	4720C1E0	19D34740	C1BE92F0	09009140	C5524780	C1DE1903	4740C290	12AA4720	C1FA1AA7			
(280)	1B77450	C26E18A7	45D0C224	45D0C224	5122C552	9754185C	91145000	4780C220	92C5E00C	47F0C22A			
(284)	92C4B000	4890C550	4890C550	47A0C234	9260B001	4E90C4C8	F311B002	4C4E96F0	800113A4	1B74472C	C1FA1AA7		
(288)	1B5A1B6A	4720C256	1A56078D	1B6518A5	96514450	C2684188	50014188	500107F0	D200B000	800012AA			
(292)	170D92F	B1148A4	C5A24740	C282444A	C28A418A	B11218A4	B7FDD2C0	4860C596	9744925C				
(296)	300	7884	567426C	C2A3D274	30F13000	07F4768F	193B4720	C2B592F0	8001277	078492F0	800207F4		
(300)	411	6000	00000000	41A0C000	00000000	42640000	00000000	433E8000	00000000	44210000	00000000		
(304)	451	82A1	45182A11	45F42400	00000000	46989680	00000000	475F5E10	483E5ACA	00000000	00000000		
(308)	452	84BE	45284BE	51568C7E	E2D031F0	59C5F2C9	CC4674F	621D6329	F1C35CA5	6A446C3B	15F9926F		
(312)	729	4F27	25179A23	78172E8A	06D0C73C	3F000000	C7000000	3A2AF31D	C4611874	33734ACA	5F6226F1		
(316)	201	357C	59A88E47	2633EC47	AB514E55	1F8B6131	3B8AB0C3	1917624F	8A762FD8	123EC561	64AF81A3		
(320)	F287FEA	27A539EA	351C451	6D8418AA	7C94E40F	BEE41D3A		76184F03	E93FF5F5	6F4146C7	8940F6A2		
(324)	58AF2980	85E24396	621D6329	F1C35CA5	584E52D6	D415B858		54D3C218	CCECEDA1	4E2386F2	6FC10000		
(328)	475F5E10	00000000	48389ACA	00000000	475F5E10	00000000	00000000	45989680	00000000	45F42400	00000000		
(332)	45186A11	00000000	44271100	00000000	453E8000	00000000	00000000	42640000	00000000	481DCD65	00000000		
(336)	472FAF18	10000000	464C4B41	00000000	457A1200	00000000	00000000	446C3500	00000000	44138800	00000000		
(340)	431F4200	00000000	42320000	00000000	41500000	00000000	00000000	45899600	00000000	3F000000	00000000		
(344)	3F147AE1	47AE147B	3E23C45B	ASE353F8	303460C5	D6388659	3C35E2D6	338DA3C2	3866378D	F923FF47	FD4AFF1E		
(348)	3AD6BF94	D5E57443	9FACBE35	CC68D5C2	DC8EE282	E6F6EAF1	EE6BF183						
(352)	9023CDB4	D210CD3C	BC744833	CB344530	C0BC4743	C85C4930	C8344830	CD8C0630	4230C849	5830CB40			
(356)	D2A33001	B0C0A430	CB0C5433	CB439823	CB0407F4	5820C840	4E000000	00000000	00280000	C080509E			
(360)	1005435	0FF0FF0F	10000000	00000000	00000000	00000000	00000000	483B5ACA	475F5E10	00000000	00000000		
(364)	41A0C000	00000000	41199993	5999999A	02000000	FD000000	00000000	00000000	00000000	00000000	00000000		
(368)	00000000	4D100001	00980080	00100009	00280158	02560480	50301C0C	92FF10CF	92001CC6	D201CC0			
(372)	4340C001	8B410001	48441020	47F41100	90050002	4940C97C	90081CF8	9401013F	98081CF8	18501B44			
(376)	500191FF	1CC24710	10464561	1B74D201	1C041C06	45601400	4560176E	43201B36	92081C0B				
(380)	95621864	4771176C	92131C0B	D2111C08	1CDA4342	1B464240	1CC49503	18364770	108A4140	00794040			
(384)	1CD49502	1B364780	109A9106	1CC44780	1CDA0201	1C041CD2	43421B36	42401CC3	91401CC3	47101006			
(388)	456151E	95311864	47711006	910F1CC0	47801006	92201AD0	92C21AD8	C2J11ADE	1CD6456C	19364342			
(392)	1B464240	1CC4911F	1CC14781	11F658F0	1CD4456F								

FILE	INFO	DATA RECORDS	MAX.	READ ERROR	SUMMARY	INPUT RETRIES
------	------	--------------	------	------------	---------	---------------

K	ECS	:	INPUT SIZE	PERM ZERO B	SHORT UNDEF.	#RECS.	TOTAL#
---	-----	---	---------------	----------------	-----------------	--------	--------

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