DATA SET CATALOG # 41

OSO III Solar X-RAY Detector

670020A-06A 21 tapes

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 This inventory information is now no longer maintained in the DSCs, but is now managed in the inventory part of the NSSDC information system.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

OSO 3

CORRECTED 8-12A X-RAY FLUX

67-020A-06A

THIS DATA SET HAS BEEN RESTORED. ORIGINALLY THERE WERE 20 7-TRACK, 556 BPI TAPES, WRITTEN IN BINARY. THERE ARE THREE RESTORED TAPES. THE DR TAPES ARE 3480 CARTRIDGES AND THE DS TAPES ARE 9-TRACK, 6250 BPI. THE ORIGINAL TAPES WERE CREATED ON AN IBM 7094 COMPUTER. THE DR AND DS NUMBERS ALONG WITH THE CORRESPONDING D NUMBERS AND TIME SPANS ARE AS FOLLOWS:

DR#	DS#	D#	FILES	TIME SPAN
DR003066	DS003066	D001582	1-417	04/05/67 - 05/02/67
		D001583	418-839	05/02/67 - 05/29/67
DR003067	DS003067	D001585	1-403	06/25/67 - 07/20/67
		D001586	404-820	07/20/67 - 08/15/67
		D001587	821-1231	08/15/67 - 09/10/67
		D001588	1232-1651	09/10/67 - 10/06/67
		D001589	1652-2069	10/06/67 - 11/02/67
		D001590	2070-2471	11/02/67 - 11/28/67
		D001591	2472-2879	11/28/67 - 12/23/67
		D001592	2880-3297	12/23/67 - 01/18/67
		D001593	3298-3712	01/18/67 - 02/13/68
DR003068	DS003068	D001594	1-426	02/13/68 - 03/11/68
		D001595	427-845	03/11/68 - 04/06/68
		D001596	846-891	04/06/68 - 04/09/68
		D005165	892-1294	04/11/68 - 05/06/68
		D005166	1295-1684	05/06/68 - 05/31/68
		D005167	1685-1995	05/31/68 - 06/30/68
		D005168	1996-2363	07/06/68 - 07/16/68

OSO 3

CORRECTED 8-12A X-RAY FLUX

67-020A-06A

This data set has been restored. There were originally 20 7-track, 556 BPI tapes written in Binary. There are 3 restored tapes. The DR tapes are 3480 cartridges and the DS tapes are 9-track, 6250 BPI. The original tapes were created on a 7094 computer. The DR, DS, and DD numbers along with the time spans are given as follows:

DR #	DS #	DD #	FILES	TIME SPAN
DR03066	DS03066	D-01582	1 - 417	04/05/67 - 05/02/67
		D-01583	418 - 839	05/02/67 - 05/29/67
DR03067	DS03067	D-01585	1 - 403	06/25/67 - 07/20/67
		D-01586	404 - 820	07/20/67 - 08/15/67
		D-01587	821 - 1231	08/15/67 - 09/10/67
		D-01588	1232 - 1651	09/10/67 - 10/06/67
		D-01589	1652 - 2069	10/06/67 - 11/02/67
		D-01590	2070 - 2471	11/02/67 - 11/28/67
		D-01591	2472 - 2879	11/28/67 - 12/23/67
		D-01592	2880 - 3297	12/23/67 - 01/18/68
		D-01593	3298 - 3712	01/18/68 - 02/13/68
DR03068	DS03068	D-01594	1 - 426	02/13/68 - 03/11/68
		D-01595	427 - 845	03/11/68 - 04/06/68
		D-01596	846 - 891	04/06/68 - 04/09/68
		D-05165	892 - 1294	04/11/68 - 05/06/68
		D-05166	1295 - 1684	05/06/68 - 05/31/68
		D-05167	1685 - 1995	05/31/68 - 06/30/68
		D-05168	1996 - 2363	07/06/68 - 07/16/68

DESCRIPTION OF MICHIGAN OSO III X-RAY DATA

I. Operation of Instrument and Its Calibration

The instrument uses as detector an ion chamber with an aluminum foil window (surface density 3.27 m gm cm^{-2}) which is filled with N_2 gas (surface density 3.18 m gm cm^{-2}). The effective aperture of the ion chamber is 3.22 cm^2. The average depth of the cylindrical chamber is 2.58 cm. The band-pass for a similar ion chamber has been published by Acton, Chubb, Kreplin and Meekins (Journal of Geophysical Research 68, 3335, 1963).

The solar flux in the interval $8 \leq \lambda \leq 12$ Å is calculated from the expression

$$I = 1.602 \times 10^{-19}\, \omega\, a\, E(8,12) \frac{\int_0^\infty \epsilon(\lambda)\, B(\lambda)\, d\lambda}{\int_8^{12} B(\lambda)\, d\lambda} \text{ ampere.}$$

Here,

I = ion chamber current in amperes,

ω = 36 eV per ion pair,

a = aperture (3.22 cm^2),

$\epsilon(\lambda)$ = efficiency of ion chamber,

$B(\lambda)$ = solar flux distribution, in ergs cm^{-2} sec^{-1} Å^{-1},

$E(8,12)$ = energy flux between $8 \leq \lambda \leq 12$ Å, ergs cm^{-2} sec^{-1}.

In the calculations, $B(\lambda)$ is taken to be a black-body distribution at 2×10^6 deg K, at all times. Thus:

$$E(8,12) = 7.75 \times 10^8\, I \text{ ergs cm}^{-2} \text{ sec}^{-1}.$$

This calibration has been checked with an Fe^{55} pre-calibrated source. The recovery of I from the telemetry depends upon instrumental calibration. The estimated over-all accuracy of a measurement, subject to calibration uncertainties and restricted by the assumption on $B(\lambda)$, is $\pm$ 6%. This does not include the effects of amplifier noise, which are small, as we now describe.

Data positions in the storage register are restricted to the 7 least-significant bits. Each digital level of the available 127 corresponds to an increment of about 37 millivolts amplifier output. Pre-launch amplifier noise levels were about 25 millivolts (high-sensitivity range) and about 5 millivolts (low-sensitivity range). Zero-offset drift, measured electrically at 5-minute intervals, has been less than 3% since launch, and much less than 1% per orbit (relative to 5 volt full-scale).

Two ranges of sensitivity are automatically selected. High sensitivity range runs from 0 to about 0.0044 ergs cm^{-2} sec^{-1}, with each of the 127 digital steps corresponding to increments of about 0.000035 ergs cm^{-2} sec^{-1}. Low sensitivity range runs from 0 to about 0.12 ergs cm^{-2} sec^{-1}, with each digital step corresponding to about 0.00095 ergs cm^{-2} sec^{-1}. Above this, the instrument saturates.

II. Data Reduction

The data presented on the data tapes were reduced as follows:

1. The data were scanned to separate solar information from background information. Each main-frame word is read out at 64 millisecond intervals. The OSO III wheel period has ranged upward from 1.7 seconds. Thus there are more non-solar background data readings than solar readings.

2. The "lowest" background data level during a 34-second interval was then selected, using criteria developed from experience with amplifier noise, commensuration of main-frame frequency and wheel rotation frequency, etc. This level includes amplifier zero offset.
3. The "lowest" background reading was subtracted from each of the solar data words for the same time interval.
4. The difference was expressed in terms of solar soft X-ray flux, taking into account the effects of instrumental temperature upon the amplifier calibration.

Particle fluxes affect the instrumental measures, in spite of the subtraction of background data. When particle fluxes are low, the subtraction technique is adequate. When particle fluxes are high, the effect is to reduce the "observed" soft X-ray fluxes, that is, a rapid and otherwise unaccountable decline in X-ray flux is caused.

These data tapes do not contain information on background measures. Users will find, however, that particle interference is generally easily discernible. Michigan has computer print-outs of all background data which can be used, if necessary.

III. Format of Data Tapes

Tapes TSK1 Corrected through TSK16 Corrected contain an initial file which is a tape label. Later tapes do not contain this tape label; these start directly with the data.

The tapes contain information in BCD, in integer binary and in floating point binary, as described below. They are seven-track tapes (the 7th track is the parity bit), generated at 556 BPI.

Blank files occur when data to be included in them was unprocessable or too "dirty" to be useful.

File 1. (Tapes TSK1 Corrected through TSK16 Corrected)

Record 1: Word 1 = 1HDRbb (b indicates blank)

(All words are BCD, with 6 characters per word.)

2 = b00000 (zero indicates zero)

3 = b00000

4 = b0000b

5 = 00b000

6 = bb0000

7 = b00000

8,9,10 = 18-character BCD name of tape.

11,12 = all blanks

13 = DDbMMM (day, month of labelling)

14 = bYYYYb (year of labelling)

Record 2: End of file mark.

Files 2 through last. (After TSK16 this would be Files 1 through last.)

Record 1: File label, BCD. Eight 6-character words. Identical to file label on NASA experimenter tapes. Contains information as to time-accuracy of data to follow. Refer to NASA write-up of OSO III Experimenter Tapes File Label Format.

SAFETY FILM KODAK

Records 2 through last (usually 4 or 5 records per file):

Word 1 - Start time of record, in integer milliseconds.

Word 2 - End time of record, in integer milliseconds.

Word 3 - Day count of year, as an integer.

Words 4 through last - Quality Control Words and Data.

There are usually about 1400 words per record, never more than 2100. These words occur in pairs: even words (4,6,8,...last -1) are Quality Control; odd words (5,7,9,....last) are Data.

Data Words: Floating-point solar X-ray flux, E(8,12) ergs cm^{-2} sec^{-1}.

Quality Control Words: (these refer to the Data word which follows them):

Bits 1-27: Integer millisecond time for the solar data point which follows.

Bit 28: Sensitivity range of operation
0 = High sensitivity
1 = Low sensitivity

Bits 29 and 30: Data Quality; 0 = good, 1 = fair, 2 = poor, 3 = very poor. This is assessed from NASA reliability flags.

Bit 31: Questionable data flag taken directly from NASA flags.
0 = not questionable
1 = questionable

KODAK SAFETY FILM

Bit 32: Last word/Time gap flag

0 = The data word is <u>not</u> the last word of a record preceding a time gap.

1 = The data word <u>is</u> the last word of a record preceding a time gap.

<u>Note</u>: This flag does not necessarily occur preceding an EOF.

Bits 33-36: All zero.

When a blank file (containing no data) occurs, only the <u>first</u> record, which contains the file label format, is included.

Users of the data on these tapes are cautioned concerning the following errors which occasionally occur in the data:

1. The first three or four data points following turn-on at satellite dawn may be excessively high.
2. Momentary very high flux readings (one data word or two or three successive data words) caused by telemetry noise and occasionally by (a) interrupted calibration signals, (b) uncompleted logic signals.
3. Telemetry noise causing very high flux readings during satellite night produces records whose length is only one or several data words.

DATA ORGANIZATION

Tape		No. of Files	Start Time U.T.		Last Time U.T.		
TSK1 Corrected		413	14^h30^m	09/03/67	15^h20^m	05/04/67	D-01581 O.K. C-01056
2	"	417	15 24	05/04/67	12 40	02/05/67	D-01582 C-01057 O.K.
3	"	423	12 46	02/05/67	06 42	29/05/67	D-01583 C-01058 O.K
4	"	432	06 47	29/05/67	02 10	25/06/67	D-01584 C-01059 O.K.
5	"	403	03 24	25/06/67	03/04	20/07/67	D-01585 C-01060 O.K
6	"	419	03 09	20/07/67	03 49	15/08/67	D-01586 O.K C-01061
7	"	411	03 54	15/08/67	01 04	10/09/67	D-01587 O.K C-01062
8	"	420	01 15	10/09/67	15 32	06/10/67	D-01588 O.K C-01063
9	"	418	17 17	06/10/67	02 16	02/11/67	D-01589 O.K. C-01064
10	"	403	02 25	02/11/67	01 11	28/11/67	D-01590 O.K C-01065
11	"	408	01 16	28/11/67	18 45	23/12/67	D-01591 O.K C-01066
12	"	418	18 50	23/12/67	21 59	18/01/68	D-01592 O.K C-01067
13	"	415	22 11	18/01/68	21 19	13/02/68	D-01593 O.K. C-01068
14	"	427	23 08	13/02/68	14 37	11/03/68	D-01594 O.K C-01069
15	"	419	16 23	11/03/68	11 24	06/04/68	D-01595 O.K. C-01070
16		46	13 09	06/04/68	09 19	09/04/68	D-01596 O.K. C-01071
No Headers 30D 17	"	403		11/04/68		06/05/68	D-05165 C-03469 O.K
18	"	390		06/05/68		31/05/68	D-05166 C-03470 O.K
19	"	311		31/05/68		30/06/68	D-05167 C-03471 O.K
20	"	366 - 1st file header only		06/07/68		16/07/68	D-05168 C-03472

June 2, 1970

OSO-3 67-020A-06A

I have successfully duped the 4 OSO-3 Teske tapes (2 dupes each). According to Charlie Marks, the number of files on each tape are as follows:

1. #17 403
2. #18 390
3. #19 311
4. #20 1631

I ran End-of-File Parity Checks on these tapes and found the number of files to be:

1. #17 4003
2. #18 390
3. #19 316* 311
4. #20 366

The tapes were dupes with the number of files indicated above.

	1st Dupe	2nd Dupe
#17	D-05165	C-03469
#18	D-05166	C-03470
#19	D-05167	C-03471
#20	D-05168	C-03472

* Tape #19 - files 312 to 316 are all EOF marks.

OCTAL DUM

TSK-1

D-01581

FILE 0413 REC 0001 CH 0048

0001	063702000100	070000100001	010400010002	001105111C

FILE 0413 REC 0002 CH 7500

0001	000245165603	000251724600	000000000137	245263600
0049	167460403260	245277000400	167460403260	245302600
0097	167460403260	245314600400	167460403260	245323000
0145	170455253230	245336200400	170455253230	245342000
0193	170662434570	245355200400	170662434570	245357600
0241	167404062660	245376600400	167404062660	245402400
0289	170404062650	245413200400	170404062650	245417000
0337	170404062650	245433400400	170626004330	245436000
0385	170626004330	245446600400	170626004330	245452400
0433	167443643140	245465600400	167443643140	245471400
0481	167443643140	245503400400	170423753000	245510400
0529	170423753000	245521200400	170423753000	245532000
0577	170645674450	245546400400	000000000000	245552200
0625	000000000000	245564200400	167443643140	245571200
0673	167443643140	245602000400	167443643140	245605600
0721	167765125360	245621000400	167765125360	245624600
0769	170523313540	245636600400	167765125360	245641200
0817	167602764140	245654400400	167602764140	245662600
0865	170475143340	245677200400	170475143340	245701600
0913	170475143340	245713400400	170475143340	245717200
0961	170475143340	245732400400	170717065020	245736400
1009	167443643140	245747200400	167443643140	245753000
1057	167443643140	245766200400	167443643140	245770600
1105	170423753000	246013400400	170423753000	246016000
1153	170423753000	246033600400	170423753000	246040400
1201	170423753000	246052400400	170423753000	246055000
1249	170423753000	246070200400	170423753000	246074000
1297	170423753000	246107200400	170631134340	246113000
1345	170423753000	246123600400	170423753000	246133400
1393	000000000000	246151200400	167412342700	246155000
1441	000000000000	246167000400	000000000000	246173600
1489	000000000000	246204400400	000000000000	246210200
1537	000000000000	246223400400	170617524260	246227200
1585	170617524260	246241200400	170617524260	246260200
1633	170617524260	246271000400	170617524260	246274600
1681	170415472740	246310000400	170415472740	246312400
1729	170415472740	246330200400	170415472740	246335200
1777	170415472740	246347200400	170415472740	246351600
1825	170415472740	246365000400	166756645300	246370600
1873	166756645300	246407600400	000000000000	246413400
1921	167602764140	246424200400	167602764140	246430000
1969	166642544440	246445600400	166642544440	246451400
2017	166642544440	246463400400	000000000000	246470400
2065	000000000000	246501200400	000000000000	246505000
2113	170645674450	246520200400	170645674450	246526400
2161	170645674450	246551200400	170645674450	246555000
2209	170423753000	246565600400	170423753000	246571400
2257	170645674450	246604600400	170443643140	246607200
2305	170443643140	246623600400	167443643140	246626200
2353	167443643140	246640200400	167443643140	246644000
2401	000000000000	246665400400	000000000000	246670000
2449	171417146744	246704400400	170634264370	246707000
2497	170634264370	246721000400	170634264370	246724600
2545	170432233040	246740000400	170432233040	246742400
2593	170432233040	246754400400	167452123200	246760200
2641	167452123200	246773400400	170657304540	246776000
2689	170432233040	247015000400	170432233040	247020600
2737	167404062620	247032600400	167404062620	247037600
2785	000000000000	247050400400	000000000000	247054200

L DUMP OF LAST FILE OF TAPES

0110511011	010403030104	000411000206	020500000000	000300000205
4526360040C	000000000000	245267400400	000000000000	245274400400
45302600400	167460403260	245305200400	167460403260	245311000400
4532300400	170455253230	245330000400	170455253230	245332400400
45342000400	170662434570	245344400400	170662434570	245350200400
45357600400	000000000000	245363400400	000000000000	245367200400
45402400400	170404062650	245405000400	157404062660	245410600400
45417000400	170404062650	245422600400	170404062650	245427600400
45436000400	170626004330	245440400400	170626004330	245444200400
45452400400	000000000000	245456200400	000000000000	245463200400
45471400400	167443643140	245474000400	167443643140	245477600400
45510400400	170423753000	245513000400	170423753000	245516600400
45532000400	170645674450	245537000400	170645674450	245544000400
45562200400	000000000000	245554600400	000000000000	245560400400
45571200400	167443643140	245573600400	167443643140	245577400400
45605600400	167443643140	245611400400	167443643140	245616400400
45524600400	167765125360	245627200400	167765125360	245633000400
45641200400	170523313540	245645000400	167602764140	245652000400
45662600400	170475143340	245666400400	170475143340	245672200400
45701600400	170475143340	245705200400	170475143340	245707600400
45717200400	170475143340	245724200400	170475143340	245726600400
45736400400	167443643140	245741000400	167443643140	245744600400
45753000400	167443643140	245760000400	167443643140	245762400400
45770600400	167443643140	245774400400	167443643140	246011000400
46016000400	170423753000	246021600400	167443643140	246025400400
46040400400	170423753000	246043000400	170423753000	246046600400
46055000400	170423753000	246060600400	170423753000	246065600400
46074000400	170423753000	246077600400	170631134340	246102200400
46113000400	170423753000	246115400400	170423753000	246121200400
46133400400	000000000000	246141600400	000000000000	246146600400
46155000400	000000000000	246157400400	000000000000	246163200400
46173600400	000000000000	246176200400	000000000000	246202000400
46210200400	000000000000	246214000400	000000000000	246221000400
46227200400	170617524260	246231600400	170617524260	246235400400
46260200400	170617524260	246262600400	170617524260	246266400400
46274600400	170415472740	246301600400	170415472740	246304200400
46312400400	170415472740	246316400400	170415472740	246322200400
46335200400	170415472740	246337600400	170415472740	246343400400
46351600400	170415472740	246355400400	166756645300	246362400400
46370600400	166756645300	246374400400	166756645300	246404000400
46413400400	170475143340	246416000400	170475143340	246420400400
46430000400	167602764140	246436200400	167602764140	246443200400
46451400400	166642544440	246455200400	166642544440	246457600400
46470400400	000000000000	246473000400	000000000000	246476600400
46505000400	000000000000	246512000400	171433707054	246515600400
46526400400	171433707054	246532200400	170645674450	246544200400
46555000400	170645674450	246557400400	170423753000	246562000400
46571400400	170423753000	246576400400	170423753000	246602200400
46607200400	170443643140	246613000400	170443643140	246616600400
46626200400	167443643140	246632000400	167443643140	246634400400
46644000400	167443643140	246652200400	167443643140	246661600400
46670000400	000000000000	246673600400	000000000000	246677400400
46707000400	170634264370	246712600400	170634264370	246715200400
46724600400	170432233040	246731600400	170432233040	246734200400
46742400400	170432233040	246746200400	170432233040	246752000400
46760200400	167452123200	246765200400	167452123200	246767600400
46776000400	170432233040	247001600400	170432233040	247005400400
47020600400	167404062620	247023200400	167404062620	247027000400
47037600400	000000000000	247042200400	167404062620	247045000400
47054200400	000000000000	247060000400	000000000000	247062400400

FILE 0413 REC 0002 CH 7500

2833	000000000000	247066200400	171417146750	24707
2881	170626004320	247104000400	170626004320	24710
2929	170404062650	247123000400	170404062650	24712
2977	166756645260	247140600400	166756645260	24715
3025	000000000000	247162200400	170427103020	24716
3073	170427103020	247201200400	167450403230	24720
3121	167460403230	247215000400	167460403230	24722
3169	167450403230	247234600400	000000000000	24723
3217	000000000000	247251200400	000000000000	24725
3265	170637414410	247270200400	170427103024	24727
3313	167452123170	247311600400	167452123170	24731
3361	167452123170	247327400400	167452123170	24733
3409	000000000000	247345200400	000000000000	24735
3457	170443643130	247363000400	170443643130	24737
3505	167435363064	247400600400	167435363064	24740
3553	167435363064	247417600400	167435363064	24743
3601	000000000000	247445000400	000000000000	24745
3649	167765125344	247462600400	167765125344	24746
3697	166773405410	247476000400	166773405410	24750
3745	166773405410	247512400400	166773405410	24751
3793	000000000000	247531400400	000000000000	24753
3841	000000000000	247550400400	000000000000	24755
3889	166714421640	247570600000	166624705750	24757
3937	165476422510	247620400000	165476422510	24762
3985	000000000000	247637400000	166664430620	24764
4033	166615541540	247654000000	166547240160	24765
4081	166572766444	247667200000	166572766444	24767
4129	166547240160	247703600000	166523124174	24771
4177	166523124174	247720200000	166523124174	24772
4225	166501324270	247734600000	167570064667	24773
4273	167570064667	247750000000	167570064667	24775
4321	167570064667	247764400000	167546264763	24776
4369	167546264763	250001000000	167546264763	2500
4417	167546264763	250014200000	167546264763	2500
4465	167747121415	250030600000	167747121415	2500
4513	167723565765	250053400000	167735246261	2500
4561	167735246261	250070000000	167711712631	2500
4609	167735246261	250103200000	167723565765	2501
4657	167711712631	250117600000	167700037477	2501
4705	170431171636	250134200000	170424244160	2501
4753	170424244160	250150600000	170424244160	2501
4801	170424244160	250164000000	170424244160	2501
4849	170417316503	250200400000	170417316503	2502
4897	170412176167	250215000000	170417316503	2502
4945	170450745640	250231400000	170450745640	2502
4993	170443625324	250244600000	170443625324	2502
5041	170443625324	250261200000	170443625324	2502
5089	170450745640	250275600000	170443625324	2503
5137	170443625324	250311000000	170443625324	2503
5185	170471302175	250325400000	170464452036	2503
5233	170464452036	250342000000	170464452036	2503
5281	170471302175	250356400000	170464452036	2503
5329	170464452036	250371600000	170464452036	2503
5377	170471302175	250406200000	170476035014	2504
5425	170471667672	250422600000	170476035014	2504
5473	170476035014	250437200000	170476035014	2504
5521	170502665153	250452400000	170476035014	2504
5569	170471667672	250467000000	170476035014	2504
5617	170476035014	250503400000	170511153516	2505
5665	170511153516	250520000000	170505006374	2505
5713	170505006374	250533000000	170511153516	2501

750	247073200400	170626004320	247075600400	170626004320	247101400400
320	247107600400	170626004320	247113400400	170404062650	247120400400
650	247126600400	170404062650	247131200400	170404062650	247135000400
260	247150200400	166756645260	247154000400	166756645260	247156400400
020	247164000400	170427103020	247170400400	170427103020	247174200400
230	247203600400	170427103020	247207400400	167460403230	247212000400
230	247321400400	167460403230	247226400400	167460403230	247231000400
000	247237200400	000000000000	247243000400	000000000000	247246800400
000	247255000400	000000000000	247262000400	170427103024	247265600400
024	247272600400	170427103024	247303400400	167452123170	247307200400
170	247315400400	167452123170	247320000400	167452123170	247323600400
170	247334400400	167452123170	247337000400	000000000000	247342600400
000	247351000400	000000000000	247364000400	170443643130	247357200400
130	247370000400	167435363064	247372400400	167435363064	247376200400
064	247404400400	167435363064	247410200400	167435363064	247415200400
064	247431600400	000000000000	247435400400	000000000000	247442400400
000	247450600400	167765125344	247453200400	167765125344	247457000400
344	247465200400	166773405410	247467600400	166773405410	247472200400
410	247500400400	166773405410	247504200400	166773405410	247506600400
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000	247534000400	000000000000	247537600400	000000000000	247543400400
000	247556600000	166714421540	247561200000	166737174630	247565000000
750	247573200000	166533631270	247577000000	166511056164	247614600000
510	247624200000	164572013240	247631200000	562433776100	247633600000
620	247643200000	166637727144	247645600000	166615541540	247650200000
160	247656400000	166615541540	247661000000	166572766444	247684600000
444	247673000000	166572766444	247675400000	166547240160	247701200000
174	247708200000	166547240160	247712000000	166523124174	247714400000
174	247722600000	166461065250	247726400000	166501324270	247731000000
667	247737200000	167570064667	247741600000	167570064667	247745400000
667	247753600000	167557745257	247756200000	167600764631	247762000000
763	247767000000	167546264763	247772600000	167546264763	247775200000
763	250003400000	167546264763	250007200000	167557745257	250011600000
763	250020000000	167534411627	250022400000	167534411627	250026200000
1415	250042600000	167723565765	250045200000	167723565765	250047600000
261	250056000000	167735246261	250061600000	167735246261	250064200000
2631	250072400000	167723565765	250075000000	167723565765	250100600000
5765	250107000000	167723565765	250111400000	167711712631	250115200000
7477	250123400000	170424244160	250126000000	170436021774	250130400000
4160	250136600000	170424244160	250142400000	170424244160	250145000000
4160	250153200000	170417316503	250155600000	170417316503	250161400000
4160	250167600000	170424244160	250172200000	170417316503	250176000000
16503	250203000000	170424244160	250206600000	170412176167	250211200000
16503	250217400000	170450745640	250223200000	170450745640	250225600000
45640	250234000000	170443625324	250236400000	170443625324	250242200000
25324	250250400000	170443625324	250253000000	170450745640	250256600000
25324	250263600000	170450745640	250267400000	170450745640	250272000000
25324	250300200000	170443625324	250304000000	170450745640	250306400000
25324	250314600000	170471302175	250317200000	170464452036	250323000000
52036	250331200000	170471302175	250333600000	170464452036	250337400000
52036	250344400000	170471302175	250350200000	170464452036	250352600000
52036	250361000000	170464452036	250364600000	170471302175	250367200000
52036	250375200000	170471302175	250377600000	170471302175	250403400000
35014	250412000000	170502665153	250414400000	170502665153	250417000000
35014	250425200000	170476035014	250431000000	170476035014	250433400000
35014	250441600000	170476035014	250445400000	170476035014	250450000000
35014	250456200000	170476035014	250460600000	170476035014	250464400000
35014	250472600000	170471667672	250475200000	170476035014	250477600000
53516	250506000000	170511153516	250511600000	170511153516	250514200000
06374	250522400000	170505006374	250526200000	170505006374	250530400000
53516	250536600000	170505006374	250541200000	170511153516	250545000000

END JOB 5160 AT 0513-54 03/08/69 NIGHT/SUNDAY RATE

CHARGES -- 3.64 MIN. (3 MIN. 38 SEC.) 3600 TIME, PLUS 2 TAPE MOUNTINGS

5 CARDS READ
116 LINES PRINTED (2 PAGES, EXCLUSIVE OF SIGN-OFF)
0 CARDS PUNCHED

```
$$$$$$$$$   $      $$   $$$$$$$                $$$$$$$$$        $
$$$$$$$$$   $$     $$   $$$$$$$$               $$$$$$$$$       $$
$$          $$$    $$   $$     $$               $$             $$$
$$          $$$$   $$   $$     $$               $$$$$$$$        $$
$$$$$$      $$ $$  $$   $$     $$               $$$$$$$$$       $$
$$$$$$      $$  $$ $$   $$     $$                      $$       $$
$$          $$   $$$$   $$     $$                      $$       $$
$$          $$    $$$   $$     $$               $$     $$       $$
$$$$$$$$$   $$     $$   $$$$$$$$                $$$$$$$$        $$
$$$$$$$$$   $$      $   $$$$$$$                  $$$$$$      $$$$$$
```

YSUNDAY RATE AB30 SCHWARTZ

LUS 2 TAPE MOUNTINGS

OFF)

6 5 8

8) 53
48
5

53

```
$$$$$$        $        $$$$$        $$$$
$$$$$$       $$       $$$$$$$      $$$$$$
            $$$      $$     $$    $$    $$
$$$$$        $$      $$           $$    $$
$$$$$$       $$      $$$$$$$      $$    $$
     $$      $$      $$$$$$$$     $$    $$
     $$      $$      $$     $$    $$    $$
     $$      $$      $$     $$    $$    $$
$$$$$$       $$       $$$$$$$      $$$$$$
$$$$$      $$$$$$       $$$$$        $$$$
```