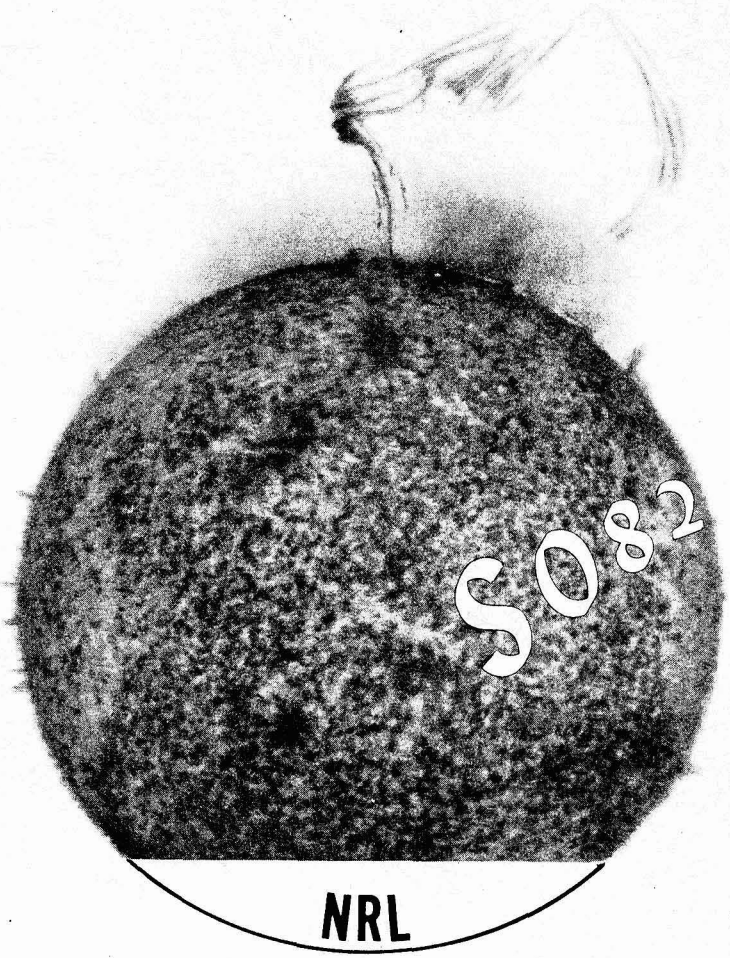
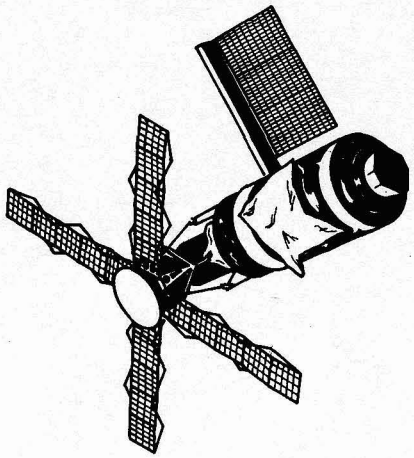
"A" Data Room

NRL/ATM
MISSION ENGINEERING DATA





S082A SPECTROHELIOGRAPH
EXPOSURES 3A-301 THROUGH 3A-500

50R

BALL BROTHERS RESEARCH CORPORATION
SUBSIDIARY OF BALL CORPORATION
BOULDER, COLORADO

A HUGE ERUPTION FROM THE SURFACE OF THE SUN SEEN IN THE LIGHT OF HE II AT 304Å
9 AUGUST 1973

This photograph, obtained during the Skylab 3 Mission, reveals for the first time that helium erupting from the sun can stay together to altitudes up to 500,000 miles. After being ejected from the sun, the gas clouds seem to have come to a standstill, as though blocked by an unseen wall, and some material appears to have been directed back toward the sun as rain, distinguished by fine threads. At present it is a challenge to explain this mystery — what forces expelled these huge clouds, then blocked its further progress, yet allowed the cloud to maintain its threads. Both magnetic fields and gravity must play a part, but these curious forms seem to defy explanation based on magnetic and gravitational fields alone.

The instrument which produced this image was an extreme ultraviolet spectroheliograph, designed and constructed by the Naval Research Laboratory and the Ball Brothers Research Corporation under the direction of Dr. R. Tousey, the Principal Investigator for this NASA experiment. To the left may be seen the sun's image in emission from iron atoms which have lost 14 electrons by collision in the suns' million-degree coronal plasma gas.

Camera No A5 SL4

Sequence Log

ATM No.	Film Roll Strip cut	Dev Run
3A301	16-12	B
3A302	16-11	3
3A303	16-10	
3A304	16-9	
3A305	16-8	
3A306	16-7	
3A307	5-9	
3A308	5-8	
3A309	5-7	
3A310	5-6	
3A311	5-5	
3A312	15-115	
3A313	15-114	
3A314	15-113	
3A315	15-112	
3A316	15-111	
3A317	15-110	
3A318	15-109	
3A319	15-107	
3A320	15-106	
3A321	15-105	3
3A322	15-104	4
3A323	15-103	
3A324	15-102	
3A325	15-101	
3A326	15-100	
3A327	15-99	
3A328	15-98	
3A329	15-94	
3A330	15-93	
3A331	15-92	
3A332	15-91	
3A333	15-90	
3A334	15-89	
3A335	15-88	
3A336	15-87	
3A337	15-86	
3A338	15-85	
3A339	15-83	
3A340	15-82	
3A341	15-81	
3A342	15-80	
3A343	15-79	
3A344	15-78	
3A345	15-77	
3A346	15-76	
3A347	15-75	
3A348	15-74	
3A349	15-70	
3A350	15-69	

ATM No.	Film Roll Strip cut	Dev Run
3A351	15-68	
3A352	15-67	
3A353	15-66	
3A354	15-65	
3A355	15-64	
3A356	15-63	
3A357	15-62	
3A358	15-61	
3A359	15-56	
3A360	15-55	
3A361	15-54	4
3A362	15-53	5
3A363	15-52	
3A364	15-51	
3A365	15-50	
3A366	15-49	
3A367	15-47	
3A368	15-45	
3A369	15-43	
3A370	15-41	
3A371	15-37	
3A372	15-36	
3A373	15-35	
3A374	15-34	
3A375	15-33	
3A376	15-31	
3A377	15-30	
3A378	15-28	
3A379	15-25	
3A380	15-24	
3A381	15-23	
3A382	15-22	
3A383	15-21	
3A384	15-20	
3A385	15-19	
3A386	15-18	
3A387	15-17	
3A388	15-16	
3A389	15-14	
3A390	15-13	
3A391	15-12	
3A392	15-11	
3A393	15-10	
3A394	15-9	
3A395	15-8	
3A396	15-7	
3A397	15-6	
3A398	15-5	
3A399	16-16	
3A400	16-17	

ATM No.	Film Roll Strip cut	Dev Run
3A401	16-18	5
3A402	16-19	1
3A403	16-20	3
3A404	16-21	
3A405	16-22	
3A406	16-23	
3A407	16-24	
3A408	16-25	
3A409	16-27	
3A410	16-28	
3A411	16-29	
3A412	16-30	
3A413	16-31	
3A414	16-32	
3A415	16-33	
3A416	16-34	
3A417	16-35	
3A418	16-36	
3A419	16-38	
3A420	16-39	
3A421	16-40	
3A422	16-41	
3A423	16-42	
3A424	16-43	3
3A425	16-44	2
3A426	16-45	
3A427	16-46	
3A428	16-47	
3A429	16-49	
3A430	16-50	
3A431	16-51	
3A432	16-52	
3A433	16-53	
3A434	16-54	
3A435	16-55	
3A436	16-56	
3A437	16-57	
3A438	16-58	
3A439	16-60	
3A440	16-61	
3A441	16-62	
3A442	16-63	
3A443	16-64	
3A444	16-65	
3A445	16-66	
3A446	16-67	
3A447	16-68	
3A448	16-69	
3A449	16-71	
3A450	16-72	

ATM No.	Film Roll Strip cut	Dev Run
3A451	16-73	
3A452	16-74	
3A453	16-75	
3A454	16-76	
3A455	16-78	
3A456	16-79	
3A457	16-80	
3A458	16-81	
3A459	16-83	
3A460	16-84	
3A461	16-85	
3A462	16-86	
3A463	16-87	
3A464	16-88	2
3A465	16-89	1
3A466	16-90	
3A467	16-91	
3A468	16-92	
3A469	17-5	
3A470	17-6	
3A471	17-7	
3A472	17-8	
3A473	17-9	
3A474	17-10	
3A475	17-11	
3A476	17-12	
3A477	17-13	
3A478	17-14	
3A479	17-16	
3A480	17-17	
3A481	17-18	
3A482	17-19	
3A483	17-20	
3A484	17-21	
3A485	17-22	
3A486	17-23	
3A487	17-24	
3A488	17-25	
3A489	17-27	
3A490	17-28	
3A491	17-29	
3A492	17-30	
3A493	17-31	
3A494	17-33	
3A495	17-34	
3A496	17-35	
3A497	17-36	
3A498	17-37	
3A499	17-39	
3A500	17-40	
3A501	16-14	1
3A502	16-13	A

Film Data	
Roll No	Film Type
15	104-06-07
16	104-06-07
17	104-06-07
5	101-06-10

BALL BROTHERS RESEARCH CORPORATION

BOULDER, COLORADO

NRL/ATM
MISSION ENGINEERING DATA
FOR
S082A SPECTROHELIOGRAPH
EXPOSURES 3A-301 THROUGH 3A-500

620-244 — 22 May 1974
Rev A — 13 May 1975

Contract No. N00014-67-C-0470
Exhibit C-1 Phase III CDRL
Sequence No. 16

PREPARED

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Project Engineer
Configuration Management

APPROVED

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NRL/ATM Program Manager

FORM BR-72

FOREWORD

The purpose of this document is to provide the camera photographic log, the JSC science console data, and the MSFC engineering data for S082A Film Camera, S/N CM10A-005 HRE (exposure numbers 3A-301 through 3A-500). The requirements for the Mission Engineering Data (MED) and the Camera Photographic Log (CPL) are combined in this document. This document was prepared by Ball Brothers Research Corporation, Boulder, Colorado, under Contract N00014-67-C-0470 with the Naval Research Laboratory, Washington, DC. The authority for the MED is BBRC Proposal C-474 which was added by Contract Modification P00055. The authority for the CPL is BBRC NRL/ATM Engineering Change Proposal PPD-054 Rev 1 which was added by Contract Modification P00064.

Acknowledgements

The following people assisted in the preparation of the report:

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Guy, J. H.
Hassig, R. E.
McDaniel, D. L.
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INTRODUCTION

1.0 INTRODUCTION

This document contains a history of each flight film frame from its receipt by BBRC from NRL through the time of its development. This includes camera identification and mission use, ground and orbit environment, loading and unloading data, filter data if applicable and the camera life history. Also included are engineering and scientific parameters related to each frame during exposure on the Skylab Mission. This exposure data is provided in the form of Engineering Data Books (EDB's) obtained from MSFC and JSC and edited by BBRC, and a Diode Array Data Log provided by NRL.

The Camera Flight Load Number, Camera Serial Number and the Exposure Numbers relative to each Skylab Mission are given in the following tables (Tables 1 and 2). Noted are the BBRC 620 Documents that should be consulted for the respective exposures. Each document is confined to a block of exposures obtained by a specific camera during the various Skylab Missions.

Table 1-1

S082A Camera Related Data

Skylab Mission	Flight Load No.	Camera Serial No.	Exposure Numbers	Referenced 620 Documents
SL-1 & 2	A-1 A-2	CM10A-003 CM10A-007	1A-001→1A-019 1A-201→1A-402	620-239 620-240
SL-3	A-2* A-3	CM10A-005 CM10A-006	2A-001→2A-201 2A-301→2A-501	620-241 620-242
SL-4	A-4 A-5	CM10A-006 HRE CM10A-005 HRE	3A-001→3A-201 3A-301→3A-500	620-243 620-244

*Replacement load for original A-2 load used during SL-1 & 2 instead of during SL-3 due to a malfunction of A003 camera.

HRE designates reflight (i.e., flown on a previous mission).

Table 1-2

S082B Camera Related Data

Skylab Mission	Flight Load No.	Camera Serial No.	Exposure Numbers	Referenced 620 Documents
SL-1 & 2	B-1	CM11A-003	1B-001-1→1B-201-8	620-245
SL-3	B-2 B-3	CM11A-005 CM11A-004	2B-001-1→2B-201-4 2B-301-1→2B-500-1	620-246 620-247
SL-4	B-4	CM11A-003 HRE	3B-001-1→3B-201-8	260-248

HRE designates reflight (i.e., flown on a previous mission).

Thermal Distortion data for the instruments relative to each Skylab Mission may be obtained from BBRC Document No. 620-238, entitled NRL/ATM Thermal Distortion Performance for S082A and S082B Instruments. Distortion data relative to a particular exposure may be time correlated to the information in the noted document. The document is published in five (5) volumes.

Volume I	Thermal Distortion Program Description
Volume II	S082A Thermal Distortion Plots SL-3 & SL-4
Volume III	S082B Thermal Distortion Plots SL-3
Volume IV	S082B Thermal Distortion Plots SL-4 DOY 332 through DOY 362
Volume V	S082B Thermal Distortion Plots SL-4 DOY 363 through DOY 383 (18 of 1974)

Additional sorting of the JSC EDB data by Joint Observing Program (JOP), target, etc. has been accomplished and is published in BBRC Document No. 620-249, entitled NRL/ATM S082 Exposure Catalog.

CAMERA AND FILM HISTORY

2.0 CAMERA AND FILM HISTORY

This section contains a compilation of data that traces the history of each exposed flight film frame beginning with camera identification and mission application. The period covered is from cold storage at BBRC, just prior to the film cutting for installation in the camera, to the time of its development at NRL. Film temperature and radiation environmental data is provided. Included are loading and unloading data providing traceability of each exposure number to a specific film roll and type, and to each control sample, film holder and exposure sequence. Pre-flight and post-flight aluminum filter data for the S082A cameras are included. Also included is an extraction, from BBRC Document No. 620-132, entitled Film Camera History, for each respective camera.

2.1 CAMERA IDENTIFICATION AND MISSION USE

Camera:	P/N 36360-501; S/N CM10A-005 HRE
Flight:	L/N A-5
No. of Film Holders:	Upper 100; Lower 101; Carrier 1
Skylab Mission:	SL-4
Launch Date:	16 November 1973
Installed on Instrument:	25 December 1973
Removed from Instrument:	3 February 1974
Splashdown:	8 February 1974

Significant Remarks:

A camera was modified to utilize "B" camera aluminum type flat film holders, P/N 39698-1, Reference NMR 27845, and Waiver No. W124. This modification was due to marks on film noted after Skylab SL-3. Launched in Command Module on SL-4, exposed on SL-4, and returned on SL-4.

2.2 ENVIRONMENTAL DATA

The Environmental Data Section includes a graph of temperature vs day-of-year from loading to unloading of the cameras, and cumulative radiation vs day-of-year for the mission period. These graphs provide a quick look at the environmental parameters to which the film was subjected (See Fig. 2-1). The source for the in-flight data is from the environmental log book maintained at the NRL Science Console.

2.3 LOADING DATA

The film camera was loaded at BBRC just prior to shipment to KSC. Film strips were cut from a roll of bulk film which was 70mm wide and approximately 120 feet long. The film strips were cut to 35 x 248mm. These strips were placed into film holders, loaded into the camera, vacuum dried, and cooled to 40°F. The attached chart (See Table 2-1) shows the relationship between each strip of film as it was cut from the bulk roll of film to control sample number or exposure number and the holder number in the order in which it was loaded. The two columns entitled "Roll #" lists the film roll number and strip number as it was cut from the roll. The column entitled "Control Sample #" numerically lists each control sample. The column entitled "Exposure #" is the number assigned by NRL to each individual exposure. The column entitled "Film Holder #" shows the film holder number at the time of loading. This chart provides a cross reference for roll, strip, exposure and holder. It also provides a cross reference between roll and strip number to control sample.

There were four (4) control samples taken at the beginning of each roll, one taken at intervals of approximately ten (10) film

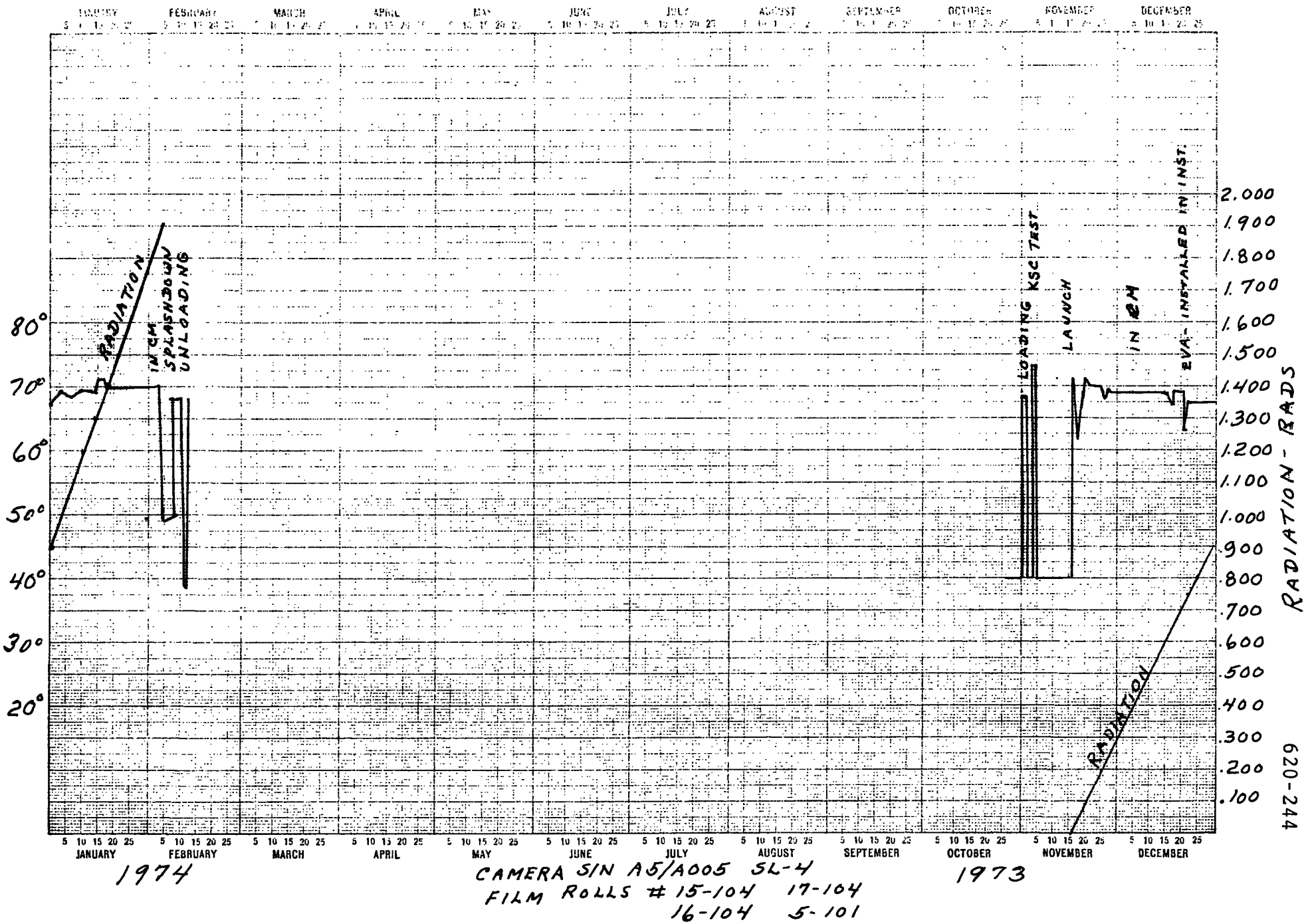


Figure 2-1. Environmental Parameters

620-244

Table 2-1

FILM TRACEABILITY CHART

DATE 3/29/74 CAMERA P/N 36360-501 S/N A5/A005 HRE

ROLL NO.	CONTROL SAMPLE NO	EXPOSURE NO.	FILM HOLDER NO.
15-1	1		
15-2	2		
15-3	3		
15-4	4		
15-5		3A398	1
15-6		3A397	2
15-7		3A396	3
15-8		3A395	4
15-9		3A394	5
15-10		3A393	6
15-11		3A392	7
15-12		3A391	8
15-13		3A390	9
15-14		3A389	10
15-15	5		
15-16		3A388	11
15-17		3A387	12
15-18		3A386	13
15-19		3A385	14
15-20		3A384	15
15-21		3A383	16
15-22		3A382	17
15-23		3A381	18
15-24		3A380	19
15-25		3A379	20
15-26	6		
15-28		3A378	21
15-30		3A377	22
15-31		3A376	23
15-33		3A375	24
15-34		3A374	25
15-35		3A373	26
15-36		3A372	27
15-37		3A371	28
15-41		3A370	29
15-43		3A369	30
15-44	7		
15-45		3A368	31
15-47		3A367	32
15-49		3A366	33
15-50		3A365	34
15-51		3A364	35
15-52		3A363	36
15-53		3A362	37
15-54		3A361	38
15-55		3A360	39
15-56		3A359	40
15-57	8		
15-61		3A358	41
15-62		3A357	42
15-63		3A356	43
15-64		3A355	44
15-65		3A354	45
15-66		3A353	46
15-67		3A352	47
15-68		3A351	48
15-69		3A350	49
15-70		3A349	50
15-73	9		
15-74		3A348	51
15-75		3A347	52
15-76		3A346	53
15-77		3A345	54
15-78		3A344	55
15-79		3A343	56
15-80		3A342	57
15-81		3A341	58
15-82		3A340	59
15-83		3A339	60
15-84	10		
15-85		3A338	61
15-86		3A337	62
15-87		3A336	63
15-88		3A335	64
15-89		3A334	65
15-90		3A333	66
15-91		3A332	67
15-92		3A331	68
15-93		3A330	69
15-94		3A329	70
15-95	11		
15-98		3A328	71
15-99		3A327	72
15-100		3A326	73
15-101		3A325	74
15-102		3A324	75
15-103		3A323	76
15-104		3A322	77
15-105		3A321	78
15-106		3A320	79
15-107		3A319	80
15-108	12		
15-109		3A318	81
15-110		3A317	82
15-111		3A316	83
15-112		3A315	84
15-113		3A314	85
15-114		3A313	86
15-115		3A312	87
15-116	13		
15-117	14		
5-1	15		
5-2	16		
5-3	17		
5-4	18		
5-5		3A311	88
5-6		3A310	89
5-7		3A309	90
5-8		3A308	91
5-9		3A307	92
16-1	19		
16-2	20		
16-3	21		
16-4	22		
16-5	23		
16-6	24		
16-7		3A306	93
16-8		3A305	94
16-9		3A304	95
16-10		3A303	96
16-11		3A302	97
16-12		3A301	98
16-13		3A502	99
16-14		3A501	100
16-15	25		
16-16		3A399	101
16-17		3A400	102
16-18		3A401	103
16-19		3A402	104
16-20		3A403	105
16-21		3A404	106
16-22		3A405	107
16-23		3A406	108
16-24		3A407	109
16-25		3A408	110
16-26	26		
16-27		3A409	111
16-28		3A410	112
16-29		3A411	113
16-30		3A412	114
16-31		3A413	115
16-32		3A414	116
16-33		3A415	117
16-34		3A416	118
16-35		3A417	119
16-36		3A418	120
16-37	27		
16-38		3A419	121
16-39		3A420	122
16-40		3A421	123
16-41		3A422	124
16-42		3A423	125
16-43		3A424	126
16-44		3A425	127
16-45		3A426	128
16-46		3A427	129
16-47		3A428	130
16-48	28		
16-49		3A429	131
16-50		3A430	132
16-51		3A431	133
16-52		3A432	134
16-53		3A433	135
16-54		3A434	136
16-55		3A435	137
16-56		3A436	138
16-57		3A437	139
16-58		3A438	140
16-59	29		
16-60		3A439	141
16-61		3A440	142
16-62		3A441	143
16-63		3A442	144
16-64		3A443	145
16-65		3A444	146
16-66		3A445	147
16-67		3A446	148
16-68		3A447	149
16-69		3A448	150
16-70	30		
16-71		3A449	151
16-72		3A450	152
16-73		3A451	153
16-75		3A452	154
16-76		3A453	155
16-77		3A454	156
16-78		3A455	157
16-79		3A456	158
16-80		3A457	159
16-81		3A458	160
16-82	31		
16-83		3A459	161
16-84		3A460	162
16-85		3A461	163
16-86		3A462	164
16-87		3A463	165
16-88		3A464	166
16-89		3A465	167
16-90		3A466	168
16-91		3A467	169
16-92		3A468	170
16-93	32		
16-94	33		
17-1	34		
17-2	35		
17-3	36		
17-4	37		
17-5		3A469	171
17-6		3A470	172
17-7		3A471	123
17-8		3A472	174
17-9		3A473	125
17-10		3A474	176
17-11		3A475	177
17-12		3A476	178
17-13		3A477	179
17-14		3A478	180
17-15	38		
17-16		3A479	181
17-17		3A480	182
17-18		3A481	183
17-19		3A482	184
17-20		3A483	185
17-21		3A484	186
17-22		3A485	187
17-23		3A486	188
17-24		3A487	189
17-25		3A488	190
17-26	39		
17-27		3A489	191
17-28		3A490	192
17-29		3A491	193
17-30		3A492	194
17-31		3A493	195
17-33		3A494	196
17-34		3A495	197
17-35		3A496	198
17-36		3A497	199
17-37		3A498	200
17-39		3A499	201
17-40		3A500	202
17-41	40		
17-42	41		
17-43	42		
17-44	43		
17-45	44		
17-56	45		

NOTE:

Exposures 3A-442, 3A-497 and 3A-498 did not have any data. Exposures 3A-501 and 3A-502 were not exposed to sunlight.

FILM DATA	
ROLL NO.	FILM TYPE
15	104-06-07
16	104-06-07
17	104-06-07
5	101-06-10

holders and two (2) taken at the end of the roll. Therefore, two (2) control samples could be used to bracket each ten (10) film holders in the event of any film degradation.

The block entitled "Film Data" at the bottom of Table 2-1 lists each roll of bulk film by number and type of film.

2.4 UNLOADING DATA

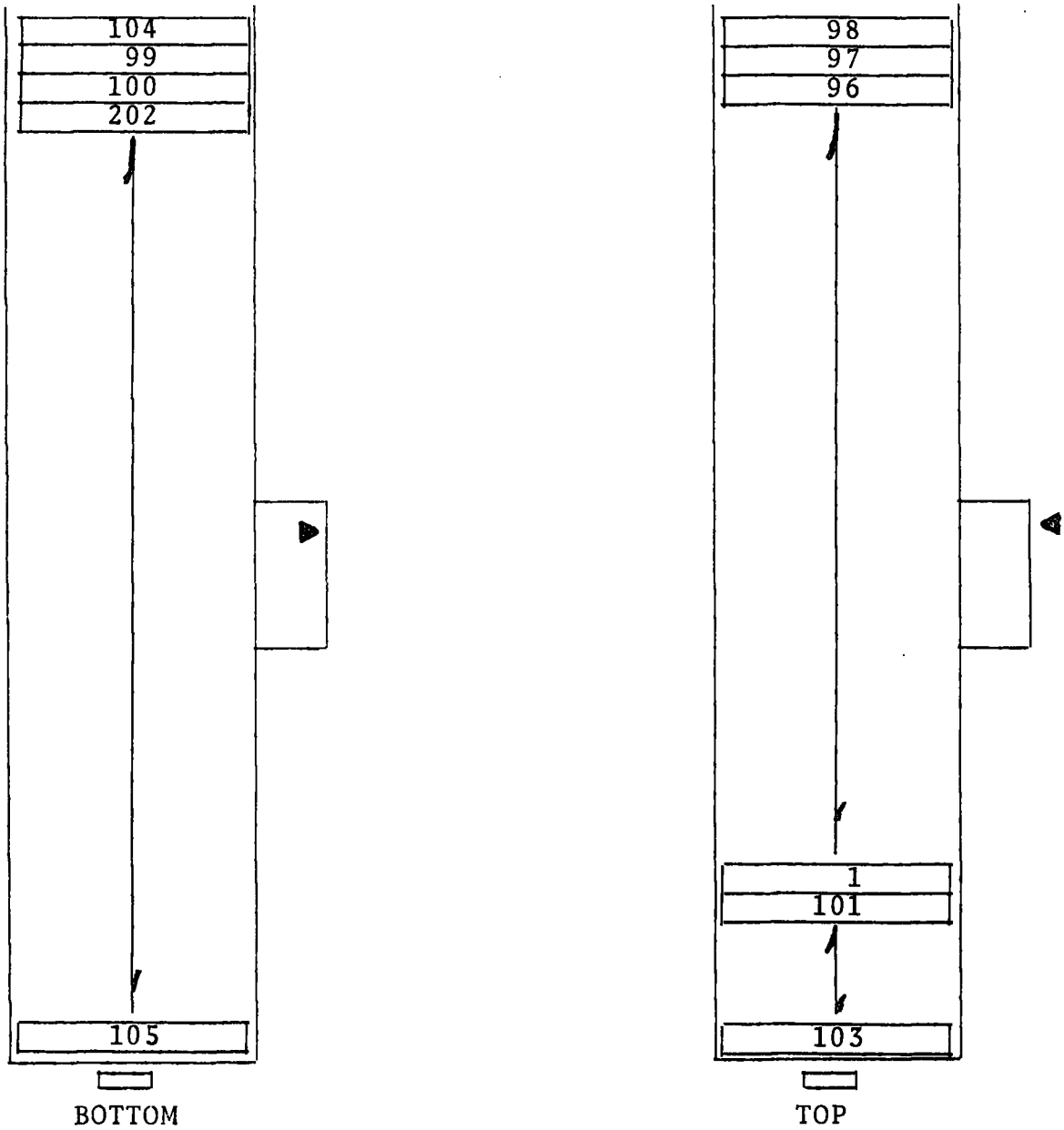
The cameras were flown to NRL after splashdown for unloading. The attached chart (see Table 2-2) shows the order in which the film holders were placed into the cassettes during the unloading operation. The film holder numbers can be traced to the loading data chart, Table 2-1, to cross reference exposure, roll and strip numbers.

The table (see Table 2-3) entitled "Developing" lists the exposure numbers and development control samples in the order in which they were developed. The development control samples are strips of film cut from the same type of film, although a different roll, to check the developing solutions, process, etc. For exposure information concerning these samples refer to the NRL McPherson Log. These samples do not relate to the control samples taken during loading. Regular development runs are numbered 1, 2, 3, etc., runs numbered A, B, etc. are preselected holders removed during unloading the camera to be developed prior to developing the complete camera load. These holders were not loaded into cassettes but were used to verify film position.

2.5 ALUMINUM FILTER DATA

An aluminum filter was located just behind the camera aperture and consisted of a thin sheet (1000Å thick) of aluminum on a wire mesh substrate. This filter screened out all light wavelengths

Table 2-2
Unloading Traceability Chart



Camera A5/A005 HRE
Date 11 Feb 1974

Table 2-3
Developing

Camera Serial No. CM10A-005 HRE

Flight Load No. A-5

Run No.	Exposure Numbers	Dev. Control Sample	Date
A	3A502		2/19/74
B	3A301		2/19/74
1	3A402 3A501 through 3A465		2/19/74
2	3A464 through 3A425		2/19/74
3	3A424 through 3A403 3A302 through 3A321		2/19/74
4	3A322 through 3A361		2/19/74
5	3A362 through 3A401		2/19/74

Rev A

except the desired wavelength band between 150 and 650Å. This filter data includes manufacturing, test and evaluation data relating to the aluminum filter installed in the camera prior to film loading. These data were compiled by the filter manufacturer, Sigmatron Inc., and the Naval Research Laboratory, and is included for reference. The contents of these data are as follows:

- Photograph of Filter (see Fig. 2-2)
- Pinhole Fogging Map (see Fig. 2-3)
- Pinhole Plugging Map (see Fig. 2-4)
- Manufacturing and Environmental Test Data (see Data Sheets, Pages 2-12 through 2-19). Rev A
- Preflight Transmission Data (see Data Sheet, page ____). *(This data lost)* Rev A
- Post Flight Transmission Data (see Fig. 2-5).

The post flight measurements were performed at NRL by Code 7143. The printouts of the reduced data (see Table 2-4) are described below:

Key to table of measured transmittances of the ATM-2 Al filters:

Column 1 Wavelength (Å)

Column 2 Although labelled "ANG. INC." these numbers identify the filters and the position on that filter at which the measurement was made. A key to these numbers is given at the top of each first page.

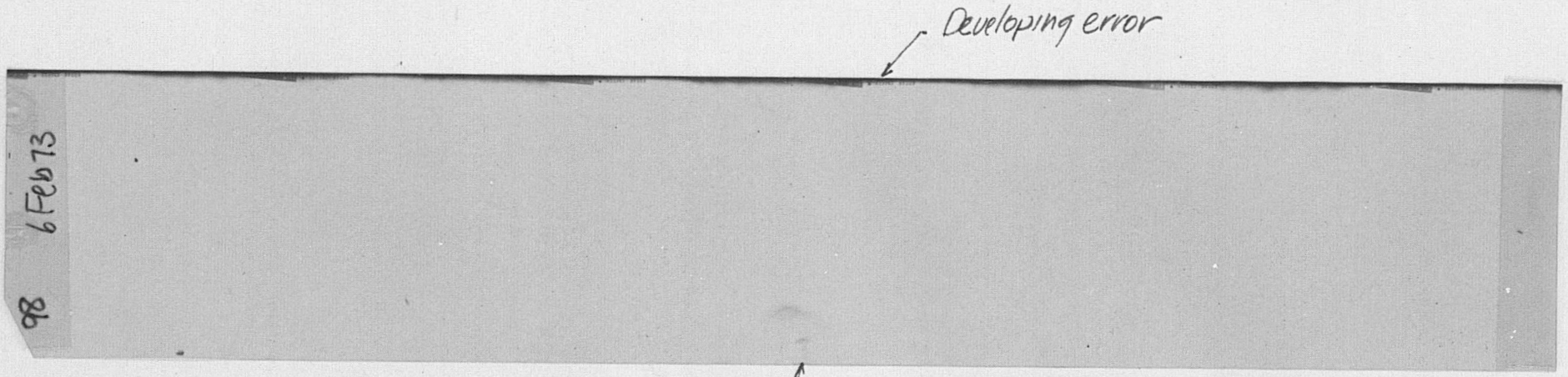
Column 3 Measured Transmittance.

Column 4 Probable Error of the Measurement.

Column 5 Probable error converted to % error.

Rev A

Figure 2-2 Photograph of Filter



PINHOLE FOGGING MAP DATE: 6Feb 73

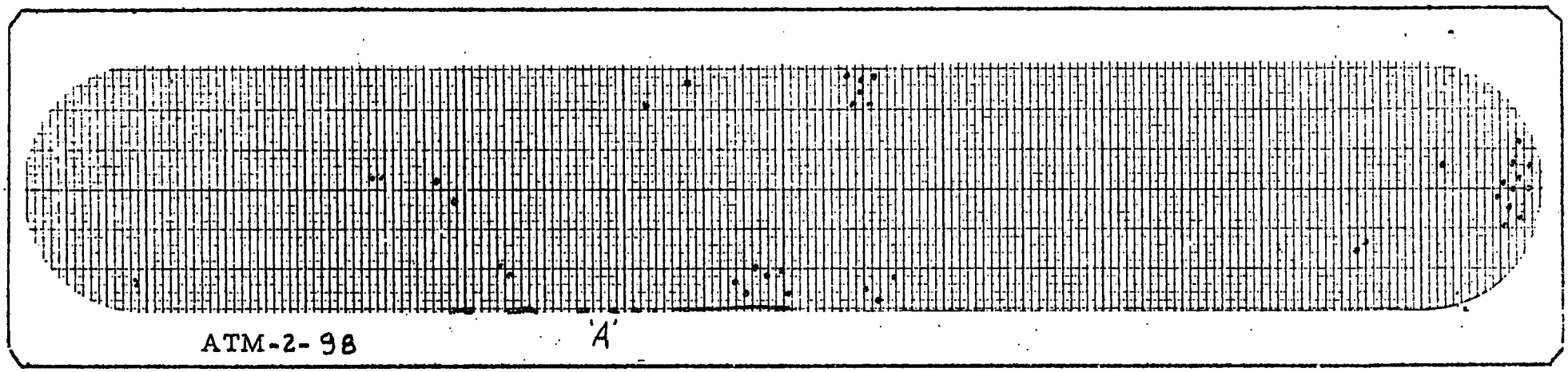
ATM-2- 98

Figure 2-3 Pinhole Fogging Map

PINHOLE PLUGGING MAP

Filter I.D. No.: ATM-2-98 Operator: G. Steele Date: 30 Jan 73

Plug Material: 3022:18/210:180 Lot No.: B2-007 Exp. Date: 6-6-74



Comments: 2nd grade - many small pinholes but no pariodion effect - no breaks or plugs - an excellent filter - very clean without any particle inclusions between screen and foil - extensive printing of margin pinholes in area 'A'

Returned from NRL for plugging

620-244

ATM FILTER DATA SHEET

FRAME NUMBER ATH-2-98

1. Frame Data:

Date Received 7-5-72 By LLS

Certification frame reclaimed by NRL

Cleaning:

Date 7-1-72 Operator LLS

Wash:

frame cleaning procedure Lot

1-26-72 Lot

Freon Lot 041-2A

Lot

Bake Temp. 100°C Time 24 HRS

2. Mounting:

Information on separate sheet.

3. Margining:

Date 7-27-72 Time 0835 Operator RE

Width .100"

Epoxy

Epon 828 Lot 324520 Amount 10 ogm 7-17-72

Versamid 125 Lot 204880 Amount 10 ogm 7-17-72

MIK Lot 36782 Amount 40 ogm

4. Prebake Photograph:

Date 8-3-72 Operator H Hill

5. Cold Cycle:

Date 7-28-72 Operator RE

Time in 1045 Temp. -30°C Time Out 1245

6. Sanitizing Bake:

Date 8-1-72 Operator RWB

Time in 1700 Time out 1430 8-2-72

Temp. 60°C Pressure <100u

7. Pre Environmental Test Photograph:

Date 8-7-72 Operator H Hill

8. Environmental Testing:

Vibration and acoustic: Date 8-8-72 Carrier Reawin

Vibration specs. NRL 7149-107 3-10-72

Acoustic specs. NRL 7149-107 3-10-72

9. Post Environmental Test Photograph:

Date 8-9-72 Operator H Hill

620-244

FOIL MOUNTING

FOIL NUMBER 457

16008 AL

Date 7-19-72

Time 1545

Operator RE

Epoxy

Type Epco 210/410 M3 Lot S-21 #1 Ex-3-7-74 Amt 20.0 gm

Type Epco 180 Lot L1-029 Ex-4-18-74 Amt 3.9 gm

Type _____ Lot _____ Amt _____

Solvent _____ Lot _____ Amt _____

_____ Lot _____ Amt _____

Comments .010" squeeze

Frames

Type ATM-2 # 98 ✓ Res. <10Ω # _____ Res. _____

Type _____ # _____ Res. _____ # _____ Res. _____

Type _____ # _____ Res. _____ # _____ Res. _____

Type _____ # _____ Res. _____ # _____ Res. _____

Type _____ # _____ Res. _____ # _____ Res. _____

Type _____ # _____ Res. _____ # _____ Res. _____

Type _____ # _____ Res. _____ # _____ Res. _____

Type _____ # _____ Res. _____ # _____ Res. _____

Trim

Date 7-19-72

Time 1530

Operator RE

Comments _____

ENVIRONMENTAL TEST

DATE: 8-9-72 SIGMATRON CARRIER: Rachel Q Erwin

TEST LOCATION: Pt Mugu, Environmental

VIBRATION TEST: NRL - 7149-107 3-10-70

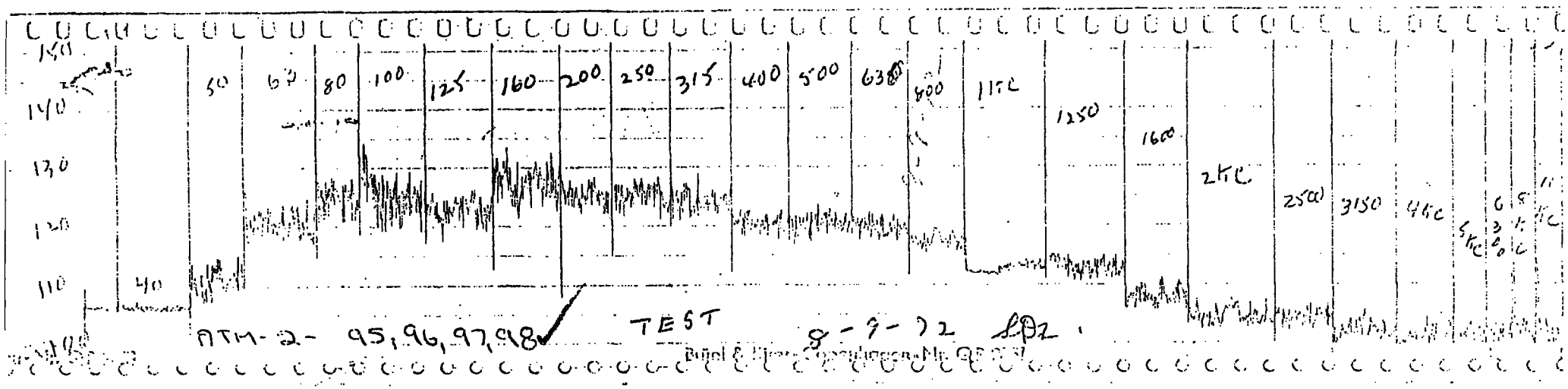
ACOUSTIC TEST: NRL - 7149-107 3-10-70

ITEM NO.	FILTER NO.
1	ATM-2-95
2	ATM-2-96
3	ATM-2-97
4	ATM-2-98 ✓

VIB TEST STARTED 1400 8.8.72.
ALL VIB TESTS ALL 3 AXIS, BOTH
SINE SWEEPS AND RANDOM COMPLETED AT
1600 8.8.72, ALL FOUR FILTERS

COMMENTS:

8-9-72
NRR PREPARED FOR ACOUSTIC TEST
0645 RAN PRE TEST BARE FIXTURE
0655 RAN TEST ALL FOUR FILTERS.


140
130
120
110
40
50
63
80
100
125
160
200
250
315
400
500
630
800
1KC
1250
1600
2KC
2500
3150
4KC
5KC
6300
8KC
10KC
ATM-2- 95,96,97,98
TEST
8-9-72

620-244

MONITOR 1600A

A+

620-244

SUBSTRATE

Date Old parlodium Operator [illegible]

Glass resoftened Lot N/A

Cleaning method C.S(1Hr)U.S(20 min in micro bath)(30 min in rinse bath) Water pik, rinse with conductivity H_2O

Parlodion

Type 3.6 Lot unknown

Quantity 25 cc. (not current Lot)

Time 1700

Installation

Date 6-28 Time 1140 Operator [illegible]

Method Wet H_2 for 10 min then strip

SOURCE

Date 6-27 Operator [illegible] 1st (2nd) 3rd Run

Material: Filament lot: J-730-A Tantalum lot: CC6187

lot: AL 1070 Si lot: PO 1977 lot: No. 8

DEPOSITION

Date 6-28 Operator [illegible]	TIME	PRESSURE
Pump down ---------- DATE 6-28	1150	—
Bake out: Temp. N/A Time N/A ----------	—	—
Start Ti pump ----------	1245	9.7×10^{-6}
Fill cold trap ----------	A	F
Fluorescein source on: @ .62A for ½hr ---------- 6-28	1300	7.5×10^{-6}
Fluorescein run: Lot Dt-1-19 Thickness 160Å 6-4	13275	2.5×10^{-6}
Top SiO source on @ N/A Lot N/A ------	—	—
Bottom SiO source on @ N/A Lot N/A ------	—	—
LN through side plates ----------	1345	1.7×10^{-6}
Ti pump off ---------- -55°C-	1407	5.1×10^{-7}
Source on ----------	1407	5.1×10^{-7}
Run @ 30.05 ±.5 Set 130	1408	7.0×10^{-6}
Crystal frequency .6 to 1.1 Run # 17		
Warm up side plates ----------	1410	8.4×10^{-7}
Substrate Removed ---------- Date 6-28	1530	1.6×10^{-6}

(SCREEN (EET

P57

Date 7-5-72 Operator RWR
Lot 141319 4-3
Lines/Inch 70
Thickness .006"
Orientation NORMAL

Heat Treatment
Fixture # 3
Date 7-5-72 Operator RWR
Temperature 500°C
Time 14R
Method Vertically suspended with .006" Au wire and 45 gm wt

Comments

Screen Mounting
Fixture # 6
Date 7-5-72 Operator RWR
Method Dry Stick / magnetic Chuck

Screen Inspection
Date 7-5-72 Operator RE
Comments No Breaks

Polyethylene Preparation
Mounting 7-5-72
Cleaning In ultrasonic submerged in freon before mounting on frames

Spray Cementing
Date 7-5-72 Operator RWR/RE
Cement
Epon Mixture Amount 200cc Ex- 9-24-72
Epon 828 Lot 4PH343 3.4%
Chloroform Lot 40859 96.6%

Versamid Mixture Amount 200cc Ex- 9-24-72
Versamid 125 Lot 1FB524 3.4%
Chloroform Lot 40859 96.6%
Date Mixed 7-3-72 Operator RLS

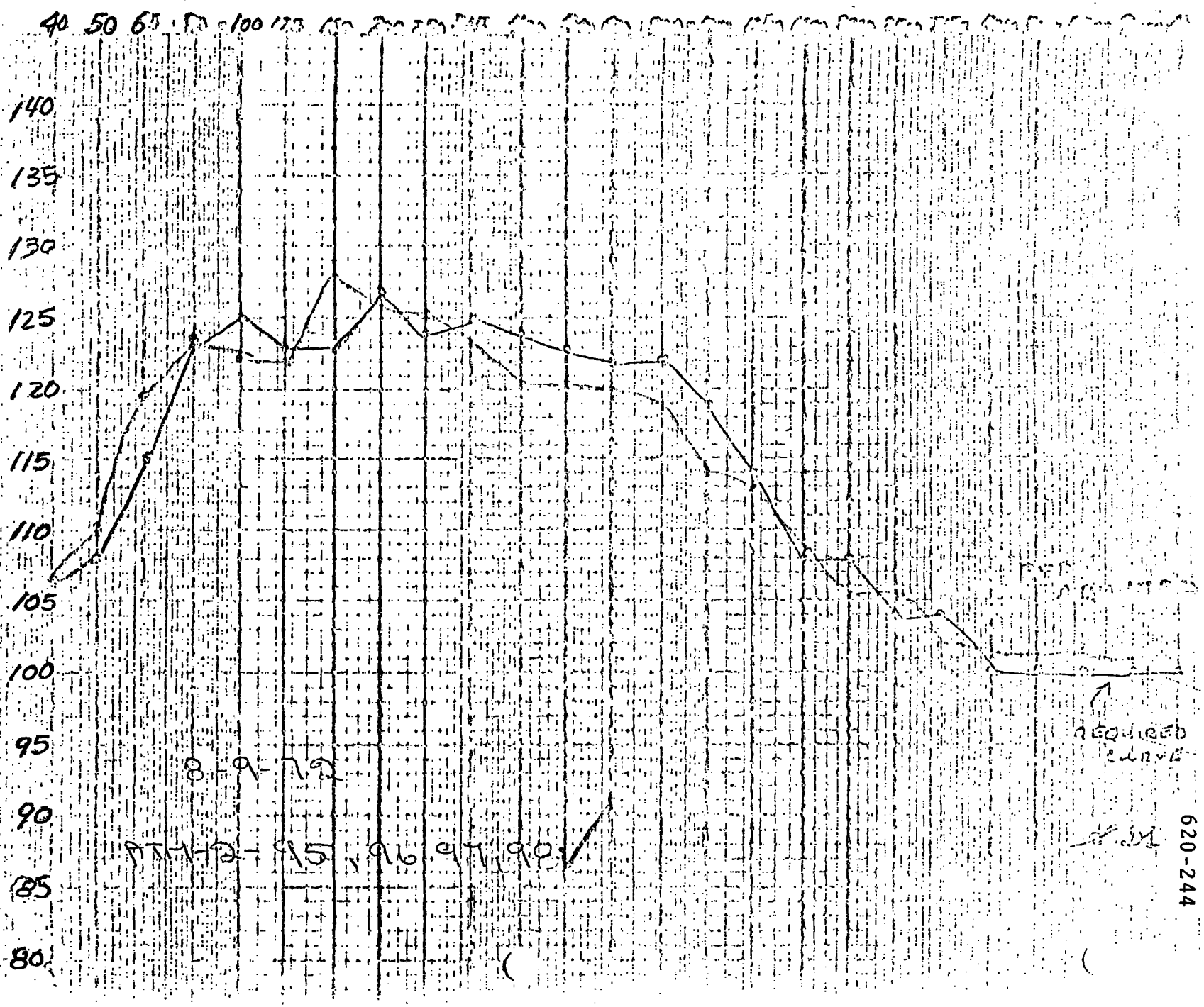
Spraying
Tank Pressure 40 PSI
Fluid Pressure 50
Atomizing Pressure 30
Delta Frequency 120 Hz
Seven Minute Bake Time 1557 to 1604
Pressing Pressure 3 PSI
Press Fixture Number 2

Releasing
Remove from press fixture and prepare for release.
Date 7-6-72 Time 1540 Operator RE

Release Bath
Date 07/06/72 Time 1710 Operator RWR
Solvent Acetone Lot J205103

Remove from release bath and store
Date 07/07/72 Time 1510 Operator RWR
Wash Solvent Acetone Lot J205103
Freon TF Lot 041-21

620-244


8-9-72
40 50 65 100
140
135
130
125
120
115
110
105
100
95
90
85
80
8-9-72
REQUIRED CURVE

620-244

Post Flight Transmission Data (Sheet 1 of 3)

This information not supplied

Post Flight Transmission Data (Sheet 2 of 3)

This information not
supplied

Post Flight Transmission Data (Sheet 2 of 3)

This information not supplied

Table 2-4
Post Flight Measurements

11

SL4 ATM FILTERS D.W.A. MEASURED 8 MARCH 1974

FILTER CAMERA IDENTIFICATION

~~ATM-285A~~ A006 11 (END NEAR NUMBER)

12(CENTER)

13(END AWAY FROM NUMBER)

ATM-2-98 A005 21(END NEAR NUMBER)

22(CENTER)

23(END AWAY FROM NUMBER)

VODAR 1P21+SS 10KV 35 PPS 200 MICRON SLITS
LIGHT SOURCE PARAMETERS ARE, ARGON LEAKE SETTING ADUSTED FOR MAX READING ON DETECTOR.LIGHT SOURCE PUMPING USED WHEN INCREASED SIGNAL COULD BE OBTAINED

WAVE LEN.	ANG. INC.	REFLEC.	PROB. ERR.	PERCENT ERR.	CHEM. SYM
717	13.00	0.0793374	0.0006472	0.82	AL
717	12.00	0.0773078	0.0005335	0.69	AL
717	11.00	0.0708338	0.0005558	0.78	AL
717	21.00	0.0799527	0.0005776	0.72	AL
717	22.00	0.0848677	0.0005043	0.59	AL
717	23.00	0.0763560	0.0004056	0.53	AL
717				V = 600 NCS1	AL
704	13.00	0.0515907	0.0001892	0.37	AL
704	12.00	0.0497525	0.0002182	0.44	AL
704	11.00	0.0464272	0.0003355	0.72	AL
704	21.00	0.0539168.	0.0003277	0.61	AL
704	22.00	0.0565737	0.0003182	0.56	AL
704	23.00	0.0505680	0.0002638	0.52	AL
704				V = 548 NCS1	AL
685	13.00	0.0480390	0.0002946	0.61	AL
685	12.00	0.0491958	0.0003788	0.77	AL
685	11.00	0.0462994	0.0003569	0.77	AL
685	21.00	0.0566552	0.0005632	0.99	AL
685	22.00	0.0581333	0.0003884	0.67	AL
685	23.00	0.0554784	0.0005417	0.98	AL
685				V = 587 NCS1	AL
662	13.00	0.1331718	0.0007282	0.55	AL
662	12.00	0.1364179	0.0010803	0.79	AL
662	11.00	0.1291881	0.0010811	0.84	AL
662	21.00	0.1449152	0.0010508	0.73	AL
662	22.00	0.1482022	0.0010514	0.71	AL
662	23.00	0.1386747	0.0009475	0.68	AL
662				V = 616 NCS1	AL
640	13.00	0.0898311	0.0005374	0.60	AL
640	12.00	0.0846025	0.0005035	0.60	AL
640	11.00	0.0780417	0.0004592	0.59	AL
640	21.00	0.0937721	0.0006797	0.72	AL
640	22.00	0.1033032	0.0004942	0.48	AL
640	23.00	0.0860927	0.0005726	0.67	AL

640					V = 549 NCS1	AL
620	13.00	0.1412726	0.0013720	0.97		AL
620	12.00	0.1418299	0.0014561	1.03		AL
620	11.00	0.1345135	0.0014566	1.08		AL
620	21.00	0.1475365	0.0013624	0.92		AL
620	22.00	0.1532534	0.0014922	0.97		AL
620	23.00	0.1429444	0.0013684	0.96		AL
620					V = 685 NCS1	AL
586	13.00	0.1401204	0.0005761	0.41		AL
586	12.00	0.1446900	0.0007654	0.53		AL
586	11.00	0.1406411	0.0005301	0.38		AL
586	21.00	0.1558166	0.0007713	0.50		AL
586	22.00	0.1615593	0.0005469	0.34		AL
586	23.00	0.1537905	0.0004173	0.27		AL
586					V = 594 NCS1	AL
560	13.00	0.1467208	0.0005663	0.39		AL
560	12.00	0.1401538	0.0005153	0.37		AL
560	11.00	0.1299086	0.0004997	0.38		AL
560	21.00	0.1478130	0.0005221	0.35		AL
560	22.00	0.1567357	0.0005386	0.34		AL
560	23.00	0.1411269	0.0006309	0.45		AL
560					V = 576 NCS1	AL
540	13.00	0.1546402	0.0005392	0.35		AL
540	12.00	0.1584208	0.0007141	0.45		AL
540	11.00	0.1535542	0.0006704	0.44		AL
540	21.00	0.1670270	0.0005525	0.33		AL
540	22.00	0.1734133	0.0005451	0.31		AL
540	23.00	0.1664578	0.0006094	0.37		AL
540					V = 600 NCS1	AL
530	13.00	0.1881111	0.0007749	0.41		AL
530	12.00	0.1952822	0.0008155	0.42		AL
530	11.00	0.1880197	0.0007338	0.39		AL
530	21.00	0.2023618	0.0007915	0.39		AL
530	22.00	0.2049417	0.0010704	0.52		AL
530	23.00	0.2010797	0.0006363	0.32		AL
530					V = 540 NCS1	AL
513	13.00	0.2089476	0.0010030	0.48		AL
513	12.00	0.2011100	0.0008793	0.44		AL
513	11.00	0.1842061	0.0008052	0.44		AL
513	21.00	0.2050903	0.0010522	0.51		AL
513	22.00	0.2147767	0.0007394	0.34		AL
513	23.00	0.1954985	0.0009856	0.50		AL
513					V = 559 NCS1	AL

482	13.00	0.2085440	0.0005833	0.28		AL
482	12.00	0.2096431	0.0005099	0.24		AL
482	11.00	0.2035683	0.0005612	0.28		AL
482	21.00	0.2198291	0.0005882	0.27		AL
482	22.00	0.2254119	0.0006488	0.29		AL
482	23.00	0.2174606	0.0007892	0.36		AL
482					V = 536 NCS1	AL
461	13.00	0.2147347	0.0006369	0.30		AL
461	12.00	0.2206511	0.0006416	0.29		AL
461	11.00	0.2108744	0.0007371	0.35		AL
461	21.00	0.2324638	0.0006739	0.29		AL
461	22.00	0.2444881	0.0006795	0.28		AL
461	23.00	0.2280872	0.0006250	0.27		AL
461					V = 553 NCS1	AL
440	13.00	0.2394975	0.0008643	0.36		AL
440	12.00	0.2390075	0.0006622	0.28		AL
440	11.00	0.2217607	0.0006149	0.28		AL
440	21.00	0.2432441	0.0008967	0.37		AL
440	22.00	0.2564948	0.0008484	0.33		AL
440	23.00	0.2328313	0.0009401	0.40		AL
440					V = 601 NCS1	AL
420	13.00	0.2393841	0.0010228	0.43		AL
420	12.00	0.2431527	0.0009145	0.38		AL
420	11.00	0.2311413	0.0007229	0.31		AL
420	21.00	0.2521693	0.0010086	0.40		AL
420	22.00	0.2559528	0.0011365	0.44		AL
420	23.00	0.2440997	0.0009457	0.39		AL
420					V = 610 NCS1	AL
400	13.00	0.2862348	0.0014451	0.50		AL
400	12.00	0.2840899	0.0014558	0.51		AL
400	11.00	0.2673820	0.0013654	0.51		AL
400	21.00	0.2907650	0.0015240	0.52		AL
400	22.00	0.3001564	0.0013376	0.45		AL
400	23.00	0.2784326	0.0010296	0.37		AL
400					V = 682 NCS1	AL
380	13.00	0.2812157	0.0013967	0.50		AL
380	12.00	0.2813593	0.0015629	0.56		AL
380	11.00	0.2725907	0.0016549	0.61		AL
380	21.00	0.2927328	0.0015703	0.54		AL
380	22.00	0.2934917	0.0015919	0.54		AL
380	23.00	0.2886613	0.0016546	0.57		AL
380					V = 686 NCS1	AL
380	13.00	0.2769758	0.0014488	0.52		AL
380	12.00	0.2839032	0.0015083	0.53		AL
380	11.00	0.2770065	0.0017521	0.63		AL

380	21.00	0.2959643	0.0014644	0.49		AL
380	22.00	0.3041234	0.0015684	0.52		AL
380	23.00	0.2941410	0.0014682	0.50		AL
380					V = 690 NCSI	AL
355	13.00	0.3002507	0.0015070	0.50		AL
355	12.00	0.2967273	0.0016285	0.55		AL
355	11.00	0.2822596	0.0014424	0.51		AL
355	21.00	0.3075953	0.0015213	0.49		AL
355	22.00	0.3140739	0.0015502	0.49		AL
355	23.00	0.2924036	0.0016249	0.56		AL
355					V = 705 NCSI	AL
334	13.00	0.3178880	0.0006218	0.20		AL
334	12.00	0.3195609	0.0006932	0.22		AL
334	11.00	0.3022699	0.0009415	0.31		AL
334	21.00	0.3274564	0.0009047	0.28		AL
334	22.00	0.3381544	0.0007924	0.23		AL
334	23.00	0.3164216	0.0008369	0.26		AL
334					V = 603 NCSI	AL
304	13.00	0.3284963	0.0012063	0.37		AL
304	12.00	0.3373542	0.0014565	0.43		AL
304	11.00	0.3166384	0.0009926	0.31		AL
304	21.00	0.3439392	0.0012554	0.36		AL
304	22.00	0.3548613	0.0012484	0.35		AL
304	23.00	0.3376019	0.0008313	0.25		AL
304					V = 619 NCSI	AL
284	13.00	0.3481321	0.0009820	0.28		AL
284	12.00	0.3469671	0.0011029	0.32		AL
284	11.00	0.3458179	0.0013578	0.39		AL
284	21.00	0.3655801	0.0013987	0.38		AL
284	22.00	0.3655700	0.0012464	0.34		AL
284	23.00	0.3634486	0.0011852	0.33		AL
284					V = 568 NCSI	AL
270	13.00	0.3563796	0.0017848	0.50		AL
270	12.00	0.3839446	0.0017287	0.45		AL
270	11.00	0.3495270	0.0021829	0.62		AL
270	21.00	0.3823806	0.0019475	0.51		AL
270	22.00	0.4012615	0.0025028	0.62		AL
270	23.00	0.3707126	0.0022670	0.61		AL
270					V = 622 NCSI	AL
260	13.00	0.3807337	0.0015833	0.42		AL
260	12.00	0.3882765	0.0015704	0.40		AL
260	11.00	0.3666830	0.0014009	0.38		AL
260	21.00	0.3891323	0.0010253	0.26		AL
260	22.00	0.3930131	0.0016766	0.43		AL
260	23.00	0.3757969	0.0012859	0.34		AL

260					V = 561 NCS1	AL
230	13.00	0.4396647	0.0008599	0.20		AL
230	12.00	0.4409403	0.0010100	0.23		AL
230	11.00	0.4276657	0.0011724	0.27		AL
230	21.00	0.4408885	0.0013548	0.31		AL
230	22.00	0.4514978	0.0015528	0.34		AL
230	23.00	0.4381713	0.0012250	0.28		AL
230					V = 573 NCS1	AL
192	13.00	0.4938297	0.0021995	0.45		AL
192	12.00	0.5013055	0.0017534	0.35		AL
192	11.00	0.4842862	0.0019526	0.40		AL
192	21.00	0.5022079	0.0016782	0.33		AL
192	22.00	0.5055053	0.0017311	0.34		AL
192	23.00	0.4938094	0.0019203	0.39		AL
192					V = 552 NCS1	AL
175	13.00	0.4978822	0.0018445	0.37		AL
175	12.00	0.4901043	0.0020686	0.42		AL
175	11.00	0.4702887	0.0018980	0.40		AL
175	21.00	0.4879449	0.0015816	0.32		AL
75	22.00	0.4812774	0.0021912	0.46		AL
175	23.00	0.4658488	0.0021774	0.47		AL
175					V = 646 NCS1	AL
168	13.00	0.0961370	0.0006788	0.71		AL
168	12.00	0.0938242	0.0006941	0.74		AL
168	11.00	0.0896511	0.0005608	0.63		AL
168	21.00	0.0924365	0.0008203	0.89		AL
168	22.00	0.0937739	0.0007298	0.78		AL
168	23.00	0.0904656	0.0007123	0.79		AL
168					V = 649 NCS1	AL
160	13.00	0.0851419	0.0006541	0.77		AL
160	12.00	0.0814625	0.0005879	0.72		AL
160	11.00	0.0778235	0.0004651	0.60		AL
160	21.00	0.0819432	0.0005030	0.61		AL
160	22.00	0.0834639	0.0005721	0.69		AL
160	23.00	0.0804719	0.0004174	0.52		AL
160					V = 608 NCS1	AL
150	13.00	0.0656866	0.0005848	0.89		AL
150	12.00	0.0639986	0.0004501	0.70		AL
50	11.00	0.0602522	0.0004964	0.82		AL
150	21.00	0.0635965	0.0004698	0.74		AL
150	22.00	0.0658804	0.0004850	0.74		AL
150	23.00	0.0629847	0.0008569	1.36		AL
150					V = 688 NCS1	AL

Between Columns 5 and 6, entries of the type "V = 750NCJ1" are for the operator's information only.

Column 6 Chemical symbol designates the metal of which the filter was made.

From 5 to 11 lines are used at the top of each first page to describe the items being measured and the conditions of measurement; i.e., type of monochromate, light source, etc.

2.6 CAMERA HISTORY

The camera Life History consists of a historical record (see Table 2-5) of the camera from the beginning of its production functional testing to the period of crew compartment fit function (C^2F^2) testing.

Operating Cycles

Column No. 1 identifies total operating cycles and starts with the initiation of production functional tests. This is the point where the camera has become an assembled and adjusted end item. For both cameras the number of cycles relates to the number of film holders transferred from the upper level to the lower level. The number of film exposures for the S082B camera is acquired by multiplying this number by eight.

Column No. 2 identifies the number of operating cycles since the last major relubrication was performed per maintenance specification 37102 (S082A) and 37103 (S082B).

Column No. 3 identifies the number of operating cycles since the last lubrication of an area exhibiting a failure condition possibly related to lubrication wearout.

Table 2-5

S/N A-005 HRE

FILM CAMERA LIFE HISTORY

CAMERA SER. NO. A-005

Date	Test Location	Test Description	Nonconf. Rpt No.	Failure Mode	Failure Cause	Failure Corrective Action	Operating Cycles 1	2	3	Type of Lubrication on Failure Area	Environment	Camera Configuration	Remarks
10-21-70 11-05-70	BBRC	Production - Functional (35854)	N/A	N/A			471				Ambient - clean room	23740, Rev AK 36360, Rev B	No significant problems encountered.
11-10-70 11-17-70	BBRC	Production - Incorporated EO's.	N/A	N/A			516				Ambient - clean room	34360, Rev N 23810, Rev Y 34360, Rev S	
11-18-70	BBRC	Production - Recheck of film focal plane (35854)	NMR 25918	Focal plane out-of-spec	Inadequate test fixtures.	Fixtures improved & installed on surface plate. Check deleted from 35854 and put in I&T procedures.	516				Ambient - clean room		Focal plane okay on new set-up.
02-23-71 03-16-71	BBRC	Production - Incorporate retractor mod. & various EO's.	N/A	N/A			968				Ambient - clean room	23810, Rev AD 23740, Rev AG 23812, Rev J 30534, Rev A 30537, Rev C 23788, Rev G	Camera configuration verified to CIL, Rev G on 3-10-71. Re-performed functional test (35854, Rev C).
06-09-71 08-02-71	BBRC	Production - Incorporate bow spring mod. & various EO's.	N/A	N/A			1607				Ambient - clean room	34360, Rev V 22726, Rev D 22721, Rev T 23810, Rev AH 23740, Rev AJ	Microswitch for motor stop is cocked at an angle. Re-performed functional test (35854, Rev G).
08-05-71 10-04-71	BBRC	Production - Incorporate new cam assy & various EO's.	NMR 26890	N/A			1758			Polyimide per BPS 18.07 & burnished MoS_2 per BPS 18.02.	Ambient - clean room	23811, Rev L 23810, Rev AM 23823, Rev E 30530, Rev C 23740, Rev AK 29344, Rev E	Lubed corners of all film holders, Part No. 22287, per Rev K. Escapement pawls, Part No. 23751 relubed after visual inpection of all accessible lubricated areas. See NMR.
10-05-71 10-06-71	BBRC	Production - Functional (35854) including thermal vacuum).	NMR 26890	Motor drive went to 2.25 sec instead of 1.9. No film advance on counter.	Motor drive microswitch failed to actuate. Normally closed contacts (non-functional) were cold welded due to apparent break in switch seal. Failure occurred on 90th cy.	Switch replaced. Break in seal at wabble-fram cup may have been result of cocked position of micro switch. (See 6-9-71 entry.)	2161	403	403 (Pawls)		1×10^{-5} torr (200 cy of camera)	Configuration verified to CIL.	

Date	Test Location	Test Description	Nonconf. Rpt No.	Failure Mode	Failure Cause	Failure Corrective Action	Operating Cycles 1	2	3	Type of Lubrication on Failure Area	Environment	Camera Configuration	Remarks
10-05-71 10-06-71													New microswitch position criteria added to adjustment specification 34360.
10-06-71	BBRC	I&T - Pre-Qual (30558)	N/A	N/A			2182	424	403		Ambient - clean room		
10-06-71 10-15-71	BBRC	I&T - Qual Vibration (30559)	NMR 26849	No transport on 67th cy of second film load after vibration. (Escapemnts didn't release carrier)	Escapement mechanism operating margins are apparently not compatible with marginal pawl/ratchet lub conditions.	Due to escapement failure the escapement system was changed to a rolling ratchet design.	2866	1108	1087	Polyimide per BPS 18.07 & burnished MoS_2 per BPS 18.03	Vehicle dynamics & high flow random - 3 axis. High 1 min/axis; Low 4 min/axis.		See NMR 26849 and Engrg Report B5405 71.057 for details.
Revision A dated 2-4-72													
11-17-71 12-02-71	BBRC	Production-Incorporate new escapement design.	NMR 26849	N/A			2866	1108	1087		Ambient - clean room	23740, Rev AP (See CIL, Rev M)	Drive Gear, 23742-1, replaced due to wear condition (probably from vibration). Cam shaft outboard support bearing replaced due to brinelled condition. Feed claw lube looks okay.
12-06-71 12-07-71	BBRC	Production-Functional (35854) including thermal vacuum.	N/A				3396	1638	1638 (cams) 503 (escap)		Ambient - clean room & 1×10^{-5} torr		
12-08-71	BBRC	I&T - Pre-Acceptance (30558)	N/A	N/A			3423				Ambient - clean room		

CAMERA SER. NO. A-005

Date	Test Location	Test Description	Nonconf. Rpt No.	Failure Mode	Failure Cause	Failure Corrective Action	Operating Cycles 1	2	3	Type of Lubrication on Failure Area	Environment	Camera Configuration	Remarks
12-09-71	BBRC	I&T - Vibration (30559)	NMR 26970	Excessive drive time on 57th cy of compliance run.	One extra film holder in upper stack.	Load designation plate put on back of camera to prevent load misinterpretation.	3685				Random Vibration	36360, Rev K	
12-10-71 12-15-71	BBRC	I&T - Thermal Vacuum (30560)	N/A	N/A			3891				1×10^{-5} torr		
12-15-71	BBRC	I&T - Post Thermal Vacuum (30561)	N/A	N/A			3904	2146	2146 (Cams) 1011 (Escap)		Ambient - Clean Room		
1-04-72 2-01-72	MSFC	Flight ATM	N/A	N/A			3904				Ambient - Clean Room		
Revision B dated 9 June 1972													
1-19-72 3-24-72	MSFC	S-082A Flt Instrument Alignment Checks	MSFC NR ———	Failed to transport with 15 holders	Unknown - camera returned to BBRC		2900				Ambient - Clean Room		
3-24-72 4-24-72	BBRC	Failure analysis	NMR 27193		Special load of film holders (15 ea. in front of top dummy spacer with no holders behind spacer) permitted spacer interference with shuttle operation.	Special load of 15 holders in field tests discontinued.	2980				Ambient - Clean Room		Back plate springs installed.
4-25-72 4-26-72	BBRC	Supplemental acceptance tests (30561, 30559, 30560 and 30561	NMR 27193				3432				Ambient - Clean Room; X axis random vibration; 1×10^{-5} torr vacuum		Camera hand-carried to MSFC.

CAMERA SER. NO. A-005

Date	Test Location	Test Description	Nonconf. Rpt No.	Failure Mode	Failure Cause	Failure Corrective Action	Operating Cycles 1	2	3	Type of Lubrication on Failure Area	Environment	Camera Configuration	Remarks
4-28-72 5-17-72	MSFC	Support of Flt ATM All Systems Test	MSFC NR M-15691	Failed to transport on 58th cy of Pre-Vib compliance run.	Unknown - camera returned to BBRC		3687				Ambient - Clean Room		Camera used during this period for AST, AST-all plugs out and C^2F^2.
5-22-72 6-02-72	BBRC	Failure analysis	NMR 27350		Metal chip (0.026 x 0.009 x 0.045) found between rail and retainer which probably caused holders to not move on rail and subsequent stoppage of shuttle operation.	New cleaning procedure being implemented. Camera inspected for evidence of burrs and loose chips.	3707				Ambient - Clean Room		
6-02-72 6-14-72	BBRC	4000 cy maintenance (dwg 37102)	NMR 27350				3707				Ambient - Clean Room		Maintenance cycles to be reduced to every 2000 cycles.
Revision	C dated	15 February,	1973										
06-15-72 10-16-72	BBRC	4000 Cycle Maintenance	NMR 27350				4470				Clean Room		Maintenance was performed and Camera was Retested per NMR 27350
10-17-72 11-06-72	KSC	Support Flight Instrument Testing	DR# 370 COM-058	Camera Failed to Cycle During Loading			4478						
11-07-72 11-30-72	BBRC	Failure Investigation and Re-acceptance	NMR 27781	Camera Failed to Cycle During Loading	Broken Bearing	EO to Loading Procedure #39384 Stating that the Camera shall not Be Operated with the Bails De-activated	4482				Clean Room		The problem was caused by operating the Camera with the Bail Arms de activated by the bail hooks.

CAMERA SER. NO. A005

Date	Test Location	Test Description	Nonconf. Rpt No.	Failure Mode	Failure Cause	Failure Corrective Action	Operating Cycles 1	2	3	Type of Lubrication on Failure Area	Environment	Camera Configuration	Remarks
12-02-72 12-06-72	KSC	C^2F^2					4819				Ambient Clean Room		
12-08-72	BBRC	Storage					4519				Ambient Clean Room		

Type of Lubrication on Failure Area

Various process specifications are identified in this column with most being BBRC proprietary processes. Brief descriptions of each are as follows:

No.	Description
NPI 425	Dry film, polyimide bonded lubricant - a proprietary process of National Process Industries. It is the same as Midwest Research's MLR-2 lubricant.
BMS 18.20	Slurry of molybdenum disulfide (MoS_2) in volatile solvents - generally applied when specified by maintenance documents 37102 and 37103 and then burnished by cycling the camera approximately 50 cycles.
BPS 18.02 or 18.06	Burnished coating of MoS_2 (mechanical adhesion only).
BPS 18.07	BBRC's equivalent of MLR-2 polyimide, dry lubricant coating.
SPS 18.09	Relubrication procedure - special process for sequencing the use of BPS 18.06 and 18.07 to lubricate film camera peculiar parts. Implemented in the 37102 and 37103 documents.

DIODE ARRAY DATA

3.0 DIODE ARRAY DATA

The diode array was located immediately adjacent to the camera mounting plate and consisted of a light emitting diode array and a lens assembly. The diode array system projected binary coded decimal time onto the film chip for exposures of 0.25 second or longer. Twenty-five bits of time of day data were recorded at shutter open and 13 least significant bits were recorded at shutter close. NRL developed the film chips, decoded and stored the data and produced a computer printout. BBRC assisted by editing the computer printout.

The time of day recorded by the diode array is mission elapsed time (MET) and is furnished by an ATM on-board computer. This computer time varied from Greenwich Mean Time (GMT) by as much as a few seconds and, therefore, required periodic updates by ground command. These updates are listed in NASA MSFC Memorandum MO-I-35-74, Subject: ATMDC Timer Updates, dated March 26, 1974.

Rev A

DOY	Day of Year
EXP TIME	Duration of Exposure

The wavelengths (λ) shown on the computer printout are manually read from the spectrograph prints and entered in the computer printout.

Rev A

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
GEORGE C. MARSHALL SPACE FLIGHT CENTER
MARSHALL SPACE FLIGHT CENTER, ALABAMA 35812

REPLY TO ATTN OF: MO-I-35-74

March 26, 1974

TO: Distribution

FROM: MO-I/Harvey Golden

SUBJECT: ATMDC Timer Updates

Enclosed is a list of ATMDC timer updates. These updates were taken from the MDRS Position Log at JSC. Although some of this information is difficult to decipher, it seems to be the best source available on timer updates. If questions arise concerning the list they should be directed to Steve Bales of the Flight Computer Section (483-3421) at JSC and discussed with someone who manned the ASCO position during the Skylab Mission. I have included a copy of the MDRS Position Log for your information.

ATMDC Timer Updates (Onboard Time)

Timer B was used in the beginning of the mission until DOY 154 when ATMDC switchover occurred. Timer A was used for the remainder of the mission except for DOY 157 when ASCO tried the Timer B again. Below is a list of clock updates and explanation as well as can be deciphered from the MDRS Position Log. These times were provided to MDRS by ASCO as he completed each timer update. All Delta updates are negative values.

2

GMT OF CLOCK RESET	ZERO SET TIME	DELTA UPDATE	COMMENTS
144:02:05:10.000	134:00:00:00.000	-11 Sec	Timer B update
148:07:40:00.0	-	-11 Sec	Timer B update
154:12:22:10.749	134:00:00:00.000	-4 Sec	Timer A update over HSK
157:01:50:00	133:23:59:44.780	-	Timer B selected
157:03:33:00	-	-18 Sec	Timer B update
157:04:09:00	-	-	Timer A selected
160:16:38:00	133:23:59:55.876	-	Changed from a timer in primary computer to a timer in secondary computer that was driven by Timer B.
162:17:16:44	-	-4 Sec	Timer A update
178:19:07:00	178:19:07:00	-4 Sec	Timer A update
189:16:02:00	134:00:00:00.401	-3 Sec	Timer A update
198:00:00:00	064:00:00:00	-	64 day clock rollover
197:23:59:57	-	-3 Sec	Timer A update over GDS
205:19:43:49	-	-3 Sec	Timer A update
219:06:13:33	198:00:00:01.553	-5 Sec	Timer A update
230:16:44:47	-	-4 Sec	Timer A update
246:01:38:00	-	-4 Sec	Timer A update
256:04:50:50	198:00:00:00.301	-3 Sec	Timer A update
267:03:17:21.277	262:00:00:01.277	-4 Sec	Timer A update
280:04:45:20.988	262:00:00:00.988	-4 Sec	Timer A update
288:07:30:00	-	-3 Sec	Timer A update
297:07:25:53	262:00:00:01.168	-3 Sec	Timer A update
306:16:10:50	262:00:00:00.775	-3 Sec	Timer A update
316:22:35:43	054:22:35:43	-3 Sec	Timer A update
326:00:00:00	000:00:00:00	-	Timer Reset
331:04:09:47	326:00:00:00.101	-3 Sec	Timer A update
342:10:29:02	-	-3 Sec	Timer A update
353:04:27:09	027:04:27:09	-3 Sec	Timer A update
367:02:51:20	041:02:51:20	-3 Sec	Timer A update
388:04:06:00	062:04:06:00	-3 Sec	Timer A update
390:00:00:01.911	008:19:30:51.249	-4 Sec	Timer A update

Ann R McNair
for Harvey Golden

Enclosure

FILM NR	DATE	DOY	SHUTTER OPEN	CLOSE	EXP TIME	WAVELENGTH
3A301	DEC 25.73	359	20H 8M 4.75S	8M 8.25S	3.50S	SHORT
3A302	DEC 26.73	360	5H 15M 6.00S	16M 8.00S	62.00S	LONG
3A303	DEC 26.73	360	5H 17M 1.00S	17M 20.50S	19.50S	SHORT
3A304	DEC 26.73	360	17H 24M 38.25S	24M 47.00S	8.75S	SHORT
3A305	DEC 27.73	361	2H 39M 23.00S	40M 22.00S	59.00S	LONG
3A306	DEC 27.73	361	2H 40M 59.25S	41M 18.00S	18.75S	SHORT
3A307	DEC 27.73	361	13H 42M 3.00S	46M 1.75S	238.75S	LONG
3A308	DEC 27.73	361	13H 47M 16.25S	14M 27.50S	1631.25S	LONG
3A309	DEC 27.73	361	15H 15M 10.50S	47M 9.50S	1919.00S	SHORT
3A310	DEC 27.73	361	16H 46M 1.00S	56M 1.25S	600.25S	SHORT
3A311	DEC 27.73	361	16H 57M 1.50S	20M 50.25S	1428.75S	LONG
3A312	DEC 28.73	362	1H 55M 0.75S	56M 0.00S	59.25S	LONG
3A313	DEC 28.73	362	1H 56M 28.50S	56M 48.00S	19.50S	SHORT
3A314	DEC 28.73	362	14H 29M 2.25S	30M 1.25S	59.00S	LONG
3A315	DEC 28.73	362	14H 32M 52.25S	33M 11.25S	19.00S	SHORT
3A316	DEC 28.73	362	19H 32M 30.00S	32M 39.50S	9.50S	SHORT
3A317	DEC 29.73	363	13H 36M 11.00S	37M 9.75S	58.75S	LONG
3A318	DEC 29.73	363	13H 37M 55.00S	38M 13.75S	18.75S	SHORT
3A319	DEC 30.73	364	13H 7M 47.75S	8M 47.00S	59.25S	LONG
3A320	DEC 30.73	364	13H 9M 7.25S	9M 26.00S	18.75S	SHORT
3A321	DEC 30.73	364	13H 14M 34.00S	15M 33.00S	59.00S	LONG
3A322	DEC 30.73	364	13H 16M 11.75S	16M 31.00S	19.25S	SHORT
3A323	DEC 31.73	365	21H 43M 28.75S	43M 58.25S	29.50S	SHORT
3A324	DEC 31.73	365	21H 50M 30.00S	50M 59.25S	29.25S	SHORT
3A325	JAN 1.74	1	2H 13M 31.50S	14M 30.50S	59.00S	LONG
3A326	JAN 1.74	1	2H 14M 59.50S	15M 18.50S	19.00S	SHORT
3A327	JAN 1.74	1	14H 40M 39.00S	41M 38.25S	59.25S	LONG
3A328	JAN 1.74	1	14H 42M 7.25S	42M 26.25S	19.00S	SHORT
3A329	JAN 2.74	2	2H 12M 12.50S	12M 31.25S	18.75S	SHORT
3A330	JAN 2.74	2	15H 29M 14.50S	30M 14.00S	59.50S	LONG
3A331	JAN 2.74	2	15H 30M 35.75S	30M 55.00S	19.25S	SHORT
3A332	JAN 3.74	3	13H 16M 2.50S	17M 1.75S	59.25S	LONG
3A333	JAN 3.74	3	13H 17M 14.00S	17M 32.75S	18.75S	SHORT
3A334	JAN 3.74	3	18H 35M 19.50S	36M 18.75S	59.25S	SHORT
3A335	JAN 4.74	4	12H 32M 35.75S	33M 35.00S	59.25S	LONG
3A336	JAN 4.74	4	12H 33M 47.25S	34M 7.00S	19.75S	SHORT
3A337	JAN 4.74	4	15H 39M 42.50S	40M 11.50S	29.00S	SHORT
3A338	JAN 5.74	5	12H 7M 16.75S	8M 15.75S	59.00S	LONG
3A339	JAN 5.74	5	12H 8M 33.00S	8M 51.75S	18.75S	SHORT
3A340	JAN 5.74	5	19H 38M 1.00S	39M 20.50S	79.50S	LONG
3A341	JAN 6.74	6	14H 18M 13.75S	19M 13.50S	59.75S	LONG
3A342	JAN 6.74	6	14H 19M 27.75S	19M 46.25S	18.50S	SHORT
3A343	JAN 7.74	7	13H 37M 2.25S	38M 5.50S	63.25S	LONG
3A344	JAN 7.74	7	13H 38M 19.25S	38M 38.25S	19.00S	SHORT
3A345	JAN 8.74	8	13H 6M 20.25S	7M 20.75S	60.50S	LONG
3A346	JAN 8.74	8	13H 7M 41.75S	8M 0.50S	18.75S	SHORT
3A347	JAN 9.74	9	12H 14M 32.00S	15M 31.00S	59.00S	LONG
3A348	JAN 9.74	9	12H 15M 41.50S	16M 1.00S	19.50S	SHORT
3A349	JAN 10.74	10	0H 56M 44.50S	57M 44.00S	59.50S	LONG
3A350	JAN 10.74	10	0H 57M 56.75S	58M 16.00S	19.25S	SHORT

FILM NR	DATE	DOY	SHUTTER OPEN	CLOSE	EXP TIME	WAVELENGTH
3A351	JAN 10,74	10	14H 45M 15.00S	46M 34.00S	79.00S	LONG
3A352	JAN 10,74	10	19H 25M 31.75S	25M 51.25S	19.50S	SHORT
3A353	JAN 10,74	10	22H 23M 49.50S	24M 48.75S	59.25S	LONG
3A354	JAN 10,74	10	22H 25M 1.00S	25M 19.75S	18.75S	SHORT
3A355	JAN 11,74	11	13H 57M 28.75S	58M 28.25S	59.50S	LONG
3A356	JAN 11,74	11	13H 59M 5.75S	59M 25.25S	19.50S	SHORT
3A357	JAN 11,74	11	16H 16M 42.75S	17M 1.75S	19.00S	SHORT
3A358	JAN 11,74	11	20H 26M 8.00S	26M 27.75S	19.75S	SHORT
3A359	JAN 12,74	12	0H 49M 34.25S	50M 33.25S	59.00S	LONG
3A360	JAN 12,74	12	0H 50M 59.25S	51M 18.25S	19.00S	SHORT
3A361	JAN 12,74	12	19H 29M 20.75S	30M 0.25S	39.50S	SHORT
3A362	JAN 13,74	13	0H 8M 4.75S	9M 3.50S	58.75S	LONG
3A363	JAN 13,74	13	0H 10M 17.75S	10M 37.50S	19.75S	SHORT
3A364	JAN 13,74	13	14H 6M 39.75S	7M 39.00S	59.25S	LONG
3A365	JAN 13,74	13	14H 7M 51.00S	8M 10.00S	19.00S	SHORT
3A366	JAN 13,74	13	16H 20M 31.50S	20M 50.75S	19.25S	SHORT
3A367	JAN 13,74	13	20H 35M 27.50S	36M 7.50S	40.00S	SHORT
3A368	JAN 13,74	13	20H 46M 4.25S	48M 44.25S	160.00S	LONG
3A369	JAN 14,74	14	13H 25M 14.50S	26M 13.25S	58.75S	LONG
3A370	JAN 14,74	14	13H 26M 25.75S	26M 45.25S	19.50S	SHORT
3A371	JAN 15,74	15	12H 47M 24.25S	48M 23.25S	59.00S	LONG
3A372	JAN 15,74	15	12H 48M 44.50S	49M 3.25S	18.75S	SHORT
3A373	JAN 15,74	15	13H 17M 53.50S	18M 52.25S	58.75S	LONG
3A374	JAN 15,74	15	13H 19M 1.50S	19M 20.25S	18.75S	SHORT
3A375	JAN 15,74	15	14H 25M 25.75S	27M 16.50S	110.75S	SHORT
3A376	JAN 15,74	15	14H 28M 28.50S	28M 48.00S	19.50S	SHORT
3A377	JAN 15,74	15	22H 19M 9.75S	19M 18.75S	9.00S	SHORT
3A378	JAN 15,74	15	22H 19M 28.25S	19M 47.75S	19.50S	SHORT
3A379	JAN 15,74	15	22H 19M 55.25S	20M 34.75S	39.50S	SHORT
3A380	JAN 15,74	15	22H 21M 6.50S	21M 35.75S	29.25S	LONG
3A381	JAN 15,74	15	22H 21M 51.50S	22M 50.75S	59.25S	LONG
3A382	JAN 15,74	15	22H 23M 5.00S	25M 4.75S	119.75S	LONG
3A383	JAN 16,74	16	12H 7M 23.50S	8M 23.00S	59.50S	LONG
3A384	JAN 16,74	16	12H 8M 39.75S	8M 59.00S	19.25S	SHORT
3A385	JAN 17,74	17	14H 34M 40.50S	35M 40.00S	59.50S	LONG
3A386	JAN 17,74	17	14H 36M 4.50S	36M 24.00S	19.50S	SHORT
3A387	JAN 17,74	17	19H 44M 20.00S	44M 59.00S	39.00S	SHORT
3A388	JAN 17,74	17	19H 45M 27.75S	48M 7.00S	159.25S	LONG
3A389	JAN 17,74	17	19H 58M 15.00S	58M 54.00S	39.00S	SHORT
3A390	JAN 17,74	17	20H 10M 39.50S	11M 19.00S	39.50S	SHORT
3A391	JAN 17,74	17	20H 46M 17.25S	47M 36.00S	78.75S	SHORT
3A392	JAN 18,74	18	14H 5M 30.75S	6M 29.50S	58.75S	LONG
3A393	JAN 18,74	18	14H 6M 59.00S	7M 17.50S	18.50S	SHORT
3A394	JAN 18,74	18	18H 52M 27.25S	52M 46.75S	19.50S	SHORT
3A395	JAN 18,74	18	18H 53M 33.00S	56M 11.75S	158.75S	SHORT
3A396	JAN 19,74	19	11H 43M 41.50S	44M 40.25S	58.75S	LONG
3A397	JAN 19,74	19	11H 46M 2.75S	46M 22.25S	19.50S	SHORT
3A398	JAN 19,74	19	13H 24M 13.75S	24M 33.00S	19.25S	SHORT
3A399	JAN 19,74	19	14H 55M 11.75S	56M 10.75S	59.00S	LONG
3A400	JAN 19,74	19	16H 29M 35.00S	29M 54.50S	19.50S	SHORT

FILM NR	DATE	DOY	SHUTTER OPEN	CLOSE	EXP TIME	WAVELENGTH
3A401	JAN 19,74	19	18H 3M 32.50S	4M 31.25S	58.75S	LONG
3A402	JAN 19,74	19	19H 41M 33.75S	41M 53.00S	19.25S	SHORT
3A403	JAN 19,74	19	19H 47M 33.75S	47M 53.00S	19.25S	SHORT
3A404	JAN 19,74	19	19H 53M 33.50S	53M 53.00S	19.50S	SHORT
3A405	JAN 19,74	19	19H 59M 34.75S	59M 54.00S	19.25S	SHORT
3A406	JAN 19,74	19	20H 5M 34.50S	5M 54.00S	19.50S	SHORT
3A407	JAN 19,74	19	20H 9M 34.50S	9M 54.00S	19.50S	SHORT
3A408	JAN 19,74	19	20H 11M 34.50S	11M 54.00S	19.50S	SHORT
3A409	JAN 19,74	19	20H 13M 34.50S	13M 54.00S	19.50S	SHORT
3A410	JAN 19,74	19	20H 15M 34.50S	15M 54.00S	19.50S	SHORT
3A411	JAN 19,74	19	20H 17M 34.25S	17M 53.75S	19.50S	SHORT
3A412	JAN 19,74	19	20H 19M 34.50S	19M 53.75S	19.25S	SHORT
3A413	JAN 19,74	19	20H 20M 34.75S	20M 53.75S	19.00S	SHORT
3A414	JAN 19,74	19	20H 21M 4.50S	21M 23.75S	19.25S	SHORT
3A415	JAN 19,74	19	20H 21M 33.50S	21M 52.75S	19.25S	SHORT
3A416	JAN 19,74	19	20H 22M 4.25S	22M 23.75S	19.50S	SHORT
3A417	JAN 19,74	19	20H 22M 34.25S	22M 53.75S	19.50S	SHORT
3A418	JAN 19,74	19	20H 23M 4.50S	23M 23.75S	19.25S	SHORT
3A419	JAN 19,74	19	20H 23M 34.50S	23M 55.25S	20.75S	SHORT
3A420	JAN 19,74	19	20H 24M 4.50S	24M 23.75S	19.25S	SHORT
3A421	JAN 19,74	19	20H 24M 34.50S	24M 53.75S	19.25S	SHORT
3A422	JAN 19,74	19	20H 25M 5.25S	25M 24.75S	19.50S	SHORT
3A423	JAN 19,74	19	20H 25M 34.50S	25M 53.75S	19.25S	SHORT
3A424	JAN 19,74	19	20H 26M 4.50S	26M 23.75S	19.25S	SHORT
3A425	JAN 19,74	19	20H 26M 34.50S	26M 53.75S	19.25S	SHORT
3A426	JAN 19,74	19	20H 27M 4.50S	27M 23.75S	19.25S	SHORT
3A427	JAN 19,74	19	21H 15M 11.75S	15M 30.75S	19.00S	SHORT
3A428	JAN 19,74	19	22H 49M 32.75S	49M 51.50S	18.75S	SHORT
3A429	JAN 20,74	20	0H 18M 21.25S	19M 20.25S	59.00S	LONG
3A430	JAN 20,74	20	1H 56M 44.00S	57M 3.00S	19.00S	SHORT
3A431	JAN 20,74	20	3H 22M 9.75S	23M 8.75S	59.00S	LONG
3A432	JAN 20,74	20	5H 24M 49.00S	25M 9.00S	20.00S	LONG
3A433	JAN 20,74	20	5H 25M 11.00S	25M 20.75S	9.75S	SHORT
3A434	JAN 20,74	20	5H 25M 23.00S	26M 28.75S	65.75S	LONG
3A435	JAN 20,74	20	8H 2M 18.25S	2M 38.00S	19.75S	LONG
3A436	JAN 20,74	20	8H 2M 40.25S	2M 50.00S	9.75S	SHORT
3A437	JAN 20,74	20	8H 2M 52.00S	3M 56.25S	64.25S	LONG
3A438	JAN 20,74	20	11H 33M 37.25S	33M 56.25S	19.00S	SHORT
3A439	JAN 20,74	20	12H 44M 59.00S	45M 58.00S	59.00S	LONG
3A440	JAN 20,74	20	12H 46M 25.25S	46M 44.00S	18.75S	SHORT
3A441	JAN 20,74	20	14H 21M 36.75S	21M 55.75S	19.00S	SHORT
3A442	JAN 20,74	20	0H 0M 0.00S	0M 0.00S	0.00S	..
3A443	JAN 20,74	20	17H 21M 4.50S	21M 23.25S	18.75S	SHORT
3A444	JAN 20,74	20	19H 37M 2.25S	38M 1.75S	59.50S	LONG
3A445	JAN 20,74	20	20H 28M 50.00S	29M 9.75S	19.75S	SHORT
3A446	JAN 20,74	20	22H 1M 38.50S	2M 37.50S	59.00S	LONG
3A447	JAN 20,74	20	22H 4M 1.50S	5M 0.50S	59.00S	LONG
3A448	JAN 20,74	20	23H 36M 55.50S	37M 15.25S	19.75S	SHORT
3A449	JAN 21,74	21	1H 7M 35.00S	8M 34.00S	59.00S	LONG
3A450	JAN 21,74	21	12H 2M 49.50S	3M 48.25S	58.75S	LONG

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FILM NR	DATE	DOY	SHUTTER OPEN	CLOSE	EXP TIME	WAVELENGTH
3A451	JAN 21,74	21	12H 4M 0.25S	4M 19.25S	19.00S	SHORT
3A452	JAN 21,74	21	23H 15M 55.75S	16M 14.25S	18.50S	SHORT
3A453	JAN 21,74	21	23H 17M 45.25S	17M 47.75S	2.50S	SHORT
3A454	JAN 21,74	21	23H 17M 49.75S	17M 59.50S	9.75S	SHORT
3A455	JAN 21,74	21	23H 18M 1.75S	18M 41.50S	39.75S	SHORT
3A456	JAN 21,74	21	23H 18M 43.50S	18M 48.25S	4.75S	LONG
3A457	JAN 21,74	21	23H 18M 50.50S	19M 10.25S	19.75S	LONG
3A458	JAN 21,74	21	23H 19M 12.25S	20M 31.75S	79.50S	LONG
3A459	JAN 21,74	21	23H 20M 33.75S	20M 36.25S	2.50S	SHORT
3A460	JAN 21,74	21	23H 20M 38.25S	20M 48.25S	10.00S	SHORT
3A461	JAN 21,74	21	23H 20M 50.25S	21M 30.00S	39.75S	SHORT
3A462	JAN 21,74	21	23H 21M 32.00S	21M 41.75S	9.75S	SHORT
3A463	JAN 21,74	21	23H 21M 44.00S	22M 23.50S	39.50S	SHORT
3A464	JAN 21,74	21	23H 22M 25.75S	23M 6.00S	40.25S	SHORT
3A465	JAN 21,74	21	23H 24M 14.00S	24M 33.25S	19.25S	SHORT
3A466	JAN 21,74	21	23H 27M 28.75S	27M 48.25S	19.50S	SHORT
3A467	JAN 21,74	21	23H 30M 26.50S	30M 45.25S	18.75S	SHORT
3A468	JAN 21,74	21	23H 35M 28.75S	35M 48.25S	19.50S	SHORT
3A469	JAN 21,74	21	23H 40M 50.25S	41M 9.25S	19.00S	SHORT
3A470	JAN 21,74	21	23H 46M 0.00S	46M 19.25S	19.25S	SHORT
3A471	JAN 22,74	22	0H 34M 25.75S	34M 45.25S	19.50S	SHORT
3A472	JAN 22,74	22	0H 49M 24.00S	49M 43.00S	19.00S	SHORT
3A473	JAN 22,74	22	11H 51M 46.50S	52M 45.75S	59.25S	LONG
3A474	JAN 22,74	22	11H 54M 41.00S	54M 59.75S	18.75S	SHORT
3A475	JAN 22,74	22	11H 59M 44.75S	0M 43.75S	59.00S	LONG
3A476	JAN 22,74	22	12H 1M 2.50S	1M 21.75S	19.25S	SHORT
3A477	JAN 22,74	22	22H 41M 6.50S	41M 46.00S	39.50S	LONG
3A478	JAN 22,74	22	22H 43M 48.50S	44M 28.00S	39.50S	LONG
3A479	JAN 22,74	22	22H 44M 37.25S	44M 46.00S	8.75S	SHORT
3A480	JAN 22,74	22	22H 46M 14.50S	46M 24.00S	9.50S	SHORT
3A481	JAN 23,74	23	12H 19M 35.50S	20M 34.75S	59.25S	LONG
3A482	JAN 23,74	23	12H 20M 46.75S	21M 5.75S	19.00S	SHORT
3A483	JAN 24,74	24	11H 38M 58.25S	39M 58.00S	59.75S	LONG
3A484	JAN 24,74	24	11H 40M 9.00S	40M 28.00S	19.00S	SHORT
3A485	JAN 25,74	25	12H 23M 6.75S	24M 5.50S	58.75S	LONG
3A486	JAN 25,74	25	12H 24M 18.00S	24M 37.50S	19.50S	SHORT
3A487	JAN 26,74	26	13H 23M 32.25S	24M 31.75S	59.50S	LONG
3A488	JAN 26,74	26	13H 24M 44.25S	25M 3.75S	19.50S	SHORT
3A489	JAN 26,74	26	22H 35M 4.75S	37M 4.25S	119.50S	LONG
3A490	JAN 26,74	26	23H 18M 34.75S	18M 40.75S	6.00S	SHORT
3A491	JAN 27,74	27	22H 12M 3.25S	13M 2.75S	59.50S	LONG
3A492	JAN 27,74	27	23H 55M 38.75S	55M 58.50S	19.75S	SHORT
3A493	JAN 28,74	28	11H 54M 40.25S	55M 39.75S	59.50S	LONG
3A494	JAN 28,74	28	11H 56M 6.00S	56M 25.75S	19.75S	SHORT
3A495	JAN 29,74	29	22H 8M 4.00S	9M 3.25S	59.25S	LONG
3A496	JAN 29,74	29	22H 9M 18.50S	9M 37.25S	18.75S	SHORT
3A497	JAN 29,74	29	0H 0M 0.00S	0M 0.00S	0.00S	BLANK
3A498	JAN 29,74	29	0H 0M 0.00S	0M 0.00S	0.00S	BLANK
3A499	JAN 30,74	30	20H 26M 13.00S	26M 32.25S	19.25S	SHORT
3A500	JAN 31,74	31	19H 8M 53.50S	9M 12.25S	18.75S	SHORT
3A501	JAN 31,74	31	0H 0M 0.00S	0M 0.00S	0.00S	BLANK
3A502	JAN 31,74	31	0H 0M 0.00S	0M 0.00S	0.00S	BLANK

4.0 ENGINEERING DATA BOOK - JSC

During all of the manned phases of the Skylab Program, NRL maintained a science console in the ATM Staff Support room at JSC. One of the duties of the NRL team member manning the science console was to record information in support of each frame of S082A and S082B film exposed by the astronauts or during unattended operations. Experiment log books for each camera were
Rev A used to record the time of each shutter opening (accurate to one minute of GMT), the day/night cycle number, the Joint Observing Program (JOP), step and building block number, the solar feature or target being studied, the exposure duration and wavelength and appropriate comments pertaining to individual frames as necessary.

At the conclusion of the Skylab Program, the experiment log books were compared frame by frame with engineering data compiled at JSC and MSFC, and with each instrument's internal diode array information. The results for this film camera are tabulated at the end of this section. Each column is labeled on the first
Rev A page of the tabulation. The FILM STRIP column is a permanently assigned frame number that identifies the mission and instrument as well as the sequence in which each frame was taken. All of the remaining columns were taken directly from the experiment log books and contain information in exactly the order described above. Comments from the experiment log books are recorded in Volume I of the NRL/ATM S082 Exposure Catalog (BBRC Document No. 620-249).

The glossary included in this section will identify all the abbreviations and symbols used as well as the name of each numbered JOP.

Rev A

MED Book Glossary

X represents a number assigned by the planning committee or by NOAA:

BSP	Bright Spot
BSX	Bright Spot and Number
CAL	Calibration, Target Unspecified
CHX	Coronal Hole and Number
EFR	Emerging Flux Region
ELB	East Limb
FXX	Filament and Number
JOP 1	Chromospheric Network
JOP 1A*	Near Sun Center (R < .5R.)
JOP 1A-1*	Step One of JOP 1A
JOP 2	Active Regions
JOP 3	Flares
JOP 4	Prominences
JOP 5	Limb Profile Studies
JOP 6	Synoptic Observations
JOP 7	Atmospheric Extinction
JOP 8	Coronal and Disk Transients
JOP 9	Solar Wind
JOP 10	Lunar Libration Clouds
JOP 11	Chromospheric Oscillations
JOP 12	Calibration
JOP 13	Night Sky Objects
JOP 14	Solar Eclipse
JOP 15	Coronal Holes
JOP 17	Bright Spot
JOP 18	Comet Kohoutek
JOP 19	Alfven Waves
JOP 20	Rapidly Changing Coronal Structure
JOP 21	Time Variations in Coronal Structure
JOP 24	Latitude Variation of Coronal Structure
JOP 25	S055 Maxi Roster

	JOP 26	Coronal and Chromospheric Structures
	JOP 27	Velocities
	K	Comet Kohoutek
	KC	Kohoutek Coma
	KN	Kohoutek Nucleus
	KT	Kohoutek Tail
	LBX	Limb and Number, 0 means 10
	LB	Limb
	LSX	Limb Scan and Number
	NCX	Network Cell and Number
	NP	North Pole
Rev A	OBS	Observing Time for Crew
	PXX	Prominence and Number
	QL	Quiet Limb
	QRX	Quiet Region and Number
	QR	Quiet Region
Rev A	S	Shopping List Designation
Rev A	SXX	Shopping List and Number
	SC	Sun Center
Rev A	SGL	Single Instrument Operation
	SP	South Pole
	UNA	Unattended
	UNK	Unknown
	VEL	Star Gamma Vel
	WLB	West Limb
	XX	Active Region Identifying Numbers, i.e. 00, 19, 27 etc.

* Sample - for specific JOP and step definitions, see JOP Summary Sheets.

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DATE	TIME	FILM-STRIP	D/N	JOP-ST	BB	TGT	EXP	WVL
DEC 25	359:20:08	3A-301	607	EVA		UNK	:03.5	S
DEC 26	360:05:15	3A-302	613	06 -1	01A	SC	1:02	L
DEC 26	360:05:16	3A-303	613	06 -1	01A	SC	:20	S
DEC 26	360:17:24	3A-304	621	SGL		SC	:09	S
DEC 27	361:02:39	3A-305	627	06 -1	01A	SC	:59	L
DEC 27	361:02:41	3A-306	627	06 -1	01A	SC	:19	S
DEC 27	361:13:42	3A-307	634	18A-2	30	K	3:59	L
DEC 27	361:13:47	3A-308	634	18A-2	30	K	27:11	L
DEC 27	361:15:15	3A-309	635	18A-1	30	K	31:59	S
DEC 27	361:16:46	3A-310	636	18A-2	30	K	10:00	S
DEC 27	361:16:57	3A-311	636	18A-2	30	K	23:49	L
DEC 28	362:01:55	3A-312	642	06 -1	01A	SC	:59	L
DEC 28	362:01:56	3A-313	642	06 -1	01A	SC	:20	S
DEC 28	362:14:29	3A-314	650	06 -1	01A	SC	:59	L
DEC 28	362:14:32	3A-315	650	06 -1	01A	SC	:19	S
DEC 28	362:19:32	3A-316	653	SGL		SC	:10	S
DEC 29	363:13:36	3A-317	665	06 -1	01A	SC	:59	L
DEC 29	363:13:37	3A-318	665	06 -1	01A	SC	:19	S
DEC 30	364:13:07	3A-319	680	06 -1	01A	SC	:59	L
DEC 30	364:13:09	3A-320	680	06 -1	01A	SC	:19	S
DEC 30	364:13:14	3A-321	680	06 -1	01A	SC	:59	L
DEC 30	364:13:16	3A-322	680	06 -1	01A	SC	:19	S
DEC 31	365:21:43	3A-323	701	01D-1	10	NP	:30	S
DEC 31	365:21:50	3A-324	701	01D-1	10	NP	:29	S
JAN 1	1:02:13	3A-325	704	06 -1	01A	SC	:59	L
JAN 1	1:02:14	3A-326	704	06 -1	01A	SC	:19	S
JAN 1	1:14:40	3A-327	712	06 -1	01A	SC	:59	L
JAN 1	1:14:42	3A-328	712	06 -1	01A	SC	:19	S
JAN 2	2:02:12	3A-329	719	06 -1	01B	12	:19	S
JAN 2	2:15:29	3A-330	728	06 -1	01A	SC	1:00	L
JAN 2	2:15:30	3A-331	728	06 -1	01A	SC	:19	S
JAN 3	3:13:16	3A-332	742	06 -1	01A	SC	:59	L
JAN 3	3:13:17	3A-333	742	06 -1	01A	SC	:19	S
JAN 3	3:18:35	3A-334	745	07 -2	15	SC	:59	S
JAN 4	4:12:32	3A-335	757	06 -1	01A	SC	:59	L
JAN 4	4:12:33	3A-336	757	06 -1	01A	SC	:20	S
JAN 4	4:15:39	3A-337	760	OBS		SC	:29	S
JAN 5	5:12:07	3A-338	772	06 -1	01A	SC	:59	L
JAN 5	5:12:08	3A-339	772	06 -1	01A	SC	:19	S

DATE	TIME	FILM-STRIP	D/N	JOP-ST	BB	TGT	EXP	WVL
JAN 5	5:19:38	3A-340	777	26 -1	28	SC	1:20	L
JAN 6	6:14:18	3A-341	789	06 -1	01A	SC	1:00	L
JAN 6	6:14:19	3A-342	789	06 -1	01A	SC	:19	S
JAN 7	7:13:37	3A-343	804	06 -1	01A	SC	1:03	L
JAN 7	7:13:38	3A-344	804	06 -1	01A	SC	:19	S
JAN 8	8:13:06	3A-345	819	06 -1	01A	SC	1:01	L
JAN 8	8:13:07	3A-346	819	06 -1	01A	SC	:19	S
JAN 9	9:12:14	3A-347	834	06 -1	01A	SC	:59	L
JAN 9	9:12:15	3A-348	834	06 -1	01A	SC	:20	S
JAN 10	10:00:56	3A-349	842	06 -1	01A	SC	1:00	L
JAN 10	10:00:57	3A-350	842	06 -1	01A	SC	:19	S
JAN 10	10:14:45	3A-351	851	SGL		SC	1:19	L
JAN 10	10:19:25	3A-352	854	OBS		SC	:20	S
JAN 10	10:22:23	3A-353	856	06 -1	01A	SC	1:00	L
JAN 10	10:22:24	3A-354	856	06 -1	01A	SC	:19	S
JAN 11	11:13:57	3A-355	866	06 -1	01A	SC	1:00	L
JAN 11	11:13:59	3A-356	866	06 -1	01A	SC	:20	S
JAN 11	11:16:16	3A-357	867	02C-6	23	LB1	:19	S
JAN 11	11:20:26	3A-358	870	08	24	17	:20	S
JAN 12	12:00:49	3A-359	873	06 -1	01A	SC	:59	L
JAN 12	12:00:50	3A-360	873	06 -1	01A	SC	:19	S
JAN 12	12:19:29	3A-361	885	06 -2	02	SC	:40	S
JAN 13	13:00:08	3A-362	888	06 -1	01A	SC	:59	L
JAN 13	13:00:10	3A-363	888	06 -1	01A	SC	:20	S
JAN 13	13:14:06	3A-364	897	06 -1	01A	SC	:59	L
JAN 13	13:14:07	3A-365	897	06 -1	01A	SC	:19	S
JAN 13	13:16:20	3A-366	898	S		20	:19	S
JAN 13	13:20:35	3A-367	901	S		17	:40	S
JAN 13	13:20:46	3A-368	901	S		17	2:40	L
JAN 14	14:13:25	3A-369	912	06 -1	01A	SC	:59	L
JAN 14	14:13:26	3A-370	912	06 -1	01A	SC	:20	S
JAN 15	15:12:47	3A-371	927	06 -1	01A	SC	:59	L
JAN 15	15:12:48	3A-372	927	06 -1	01A	SC	:20	S
JAN 15	15:13:17	3A-373	927	06 -1	01A	SC	:59	L
JAN 15	15:13:18	3A-374	927	06 -1	01A	SC	:19	S
JAN 15	15:14:25	3A-375	928	S		14	1:51	S
JAN 15	15:14:28	3A-376	928	S		14	:20	S
JAN 15	15:22:19	3A-377	933	12F-1	21A	CAL	:09	S
JAN 15	15:22:19	3A-378	933	12F-1	21A	CAL	:20	S

DATE	TIME	FILM-STRIP	D/N	JOP-ST	BB	TGT	EXP	WVL
JAN 15	15:22:19	3A-379	933	12F-1	21A	CAL	:40	S
JAN 15	15:22:21	3A-380	933	12F-1	21A	CAL	:29	L
JAN 15	15:22:21	3A-381	933	12F-1	21A	CAL	:59	L
JAN 15	15:22:23	3A-382	933	12F-1	21A	CAL	2:00	L
JAN 16	16:12:07	3A-383	942	06 -1	01A	SC	1:00	L
JAN 16	16:12:08	3A-384	942	06 -1	01A	SC	:19	S
JAN 17	17:14:34	3A-385	959	06 -1	01A	SC	1:00	L
JAN 17	17:14:36	3A-386	959	06 -1	01A	SC	:20	S
JAN 17	17:19:44	3A-387	962	08A-3	17	SC	:39	S
JAN 17	17:19:45	3A-388	962	08A-3	17	SC	2:39	L
JAN 17	17:19:58	3A-389	962	08A-3	17	SC	:39	S
JAN 17	17:20:10	3A-390	962	08A-3	17	SC	:40	S
JAN 17	17:20:46	3A-391	963	08A-3	17	SC	1:20	S
JAN 18	18:14:05	3A-392	974	06 -1	01A	SC	:59	L
JAN 18	18:14:06	3A-393	974	06 -1	01A	SC	:19	S
JAN 18	18:18:52	3A-394	977	08A-3	10	F81	:20	S
JAN 18	18:18:53	3A-395	977	08A-3	10	F81	2:39	S
JAN 19	19:11:43	3A-396	988	06 -1	01A	SC	:59	L
JAN 19	19:11:46	3A-397	988	06 -1	01A	SC	:20	S
JAN 19	19:13:24	3A-398	989	06 -1	32	SC	:19	S
JAN 19	19:14:55	3A-399	990	06 -1	32	SC	:59	L
JAN 19	19:16:29	3A-400	991	06 -2	32	SC	:19	S
JAN 19	19:18:03	3A-401	992	06 -2	32	SC	:59	L
JAN 19	19:19:41	3A-402	993	06 -2	32	21	:19	S
JAN 19	19:19:47	3A-403	993	06 -2	32	21	:19	S
JAN 19	19:19:53	3A-404	993	06 -2	32	21	:20	S
JAN 19	19:19:59	3A-405	993	06 -2	32	21	:19	S
JAN 19	19:20:05	3A-406	993	06 -2	32	21	:20	S
JAN 19	19:20:09	3A-407	993	06 -2	32	21	:20	S
JAN 19	19:20:11	3A-408	993	06 -2	32	21	:20	S
JAN 19	19:20:13	3A-409	993	06 -2	32	21	:20	S
JAN 19	19:20:15	3A-410	993	06 -2	32	21	:20	S
JAN 19	19:20:17	3A-411	993	06 -2	32	21	:20	S
JAN 19	19:20:19	3A-412	993	06 -2	32	21	:19	S
JAN 19	19:20:20	3A-413	993	06 -2	32	21	:19	S
JAN 19	19:20:21	3A-414	993	06 -2	32	21	:19	S
JAN 19	19:20:21	3A-415	993	06 -2	32	21	:19	S
JAN 19	19:20:22	3A-416	993	06 -2	32	21	:20	S
JAN 19	19:20:22	3A-417	993	06 -2	32	21	:20	S

DATE	TIME	FILM-STRIP	D/N	JOP-ST	BB	TGT	EXP	WVL
JAN 19	19:20:23	3A-418	993	06 -2	32	21	:19	S
JAN 19	19:20:23	3A-419	993	06 -2	32	21	:21	S
JAN 19	19:20:24	3A-420	993	06 -2	32	21	:19	S
JAN 19	19:20:24	3A-421	993	06 -2	32	21	:19	S
JAN 19	19:20:25	3A-422	993	06 -2	32	21	:20	S
JAN 19	19:20:25	3A-423	993	06 -2	32	21	:19	S
JAN 19	19:20:26	3A-424	993	06 -2	32	21	:19	S
JAN 19	19:20:26	3A-425	993	06 -2	32	21	:19	S
JAN 19	19:20:27	3A-426	993	06 -2	32	21	:19	S
JAN 19	19:21:15	3A-427	994	06 -2	32	SC	:19	S
JAN 19	19:22:49	3A-428	995	06 -2	32	SC	:19	S
JAN 20	20:00:18	3A-429	996	06 -1	01A	SC	:59	L
JAN 20	20:01:56	3A-430	997	02C-6	28	21	:19	S
JAN 20	20:03:22	3A-431	998	SGL		SC	:59	L
JAN 20	20:05:24	3A-432	999	UNA		SC	:20	L
JAN 20	20:05:25	3A-433	999	UNA		SC	:10	S
JAN 20	20:05:25	3A-434	999	UNA		SC	1:06	L
JAN 20	20:08:02	3A-435	1001	UNA		SC	:20	L
JAN 20	20:08:02	3A-436	1001	UNA		SC	:10	S
JAN 20	20:08:02	3A-437	1001	UNA		SC	1:04	L
JAN 20	20:11:33	3A-438	1003	SGL		SC	:19	S
JAN 20	20:12:44	3A-439	1004	06 -1	01A	SC	:59	L
JAN 20	20:12:46	3A-440	1004	06 -1	01A	SC	:19	S
JAN 20	20:14:21	3A-441	1005	SGL		SC	:19	S
JAN 20	20:14:43	3A-442	1005	OBS	28	31	:20	S
JAN 20	20:17:21	3A-443	1007	SGL		SC	:19	S
JAN 20	20:19:37	3A-444	1008	SGL		SC	1:00	L
JAN 20	20:20:28	3A-445	1008	SGL		SC	:20	S
JAN 20	20:22:01	3A-446	1009	SGL		SC	:59	L
JAN 20	20:22:03	3A-447	1010	SGL		SC	:59	L
JAN 20	20:23:36	3A-448	1011	SGL		SC	:20	S
JAN 21	21:01:07	3A-449	1012	06 -1	01A	SC	1:00	L
JAN 21	21:12:02	3A-450	1019	06 -1	01A	SC	:59	L
JAN 21	21:12:03	3A-451	1019	06 -1	01A	SC	:19	S
JAN 21	21:23:15	3A-452	1026	03	08	31	:19	S
JAN 21	21:23:17	3A-453	1026	03	08	31	:02.5	S
JAN 21	21:23:17	3A-454	1026	03	08	31	:10	S
JAN 21	21:23:17	3A-455	1026	03	08	31	:40	S
JAN 21	21:23:18	3A-456	1026	03	08	31	:05	L

DATE	TIME	FILM-STRIP	D/N	JOP-ST	RB	TGT	EXP	WVL
JAN 21	21:23:18	3A-457	1026	03	08	31	:20	L
JAN 21	21:23:19	3A-458	1026	03	08	31	1:20	L
JAN 21	21:23:20	3A-459	1026	03	08	31	:02.5	S
JAN 21	21:23:20	3A-460	1026	03	08	31	:10	S
JAN 21	21:23:20	3A-461	1026	03	08	31	:40	S
JAN 21	21:23:21	3A-462	1026	03	08	31	:10	S
JAN 21	21:23:21	3A-463	1026	03	08	31	:40	S
JAN 21	21:23:22	3A-464	1026	03	08	31	:40	S
JAN 21	21:23:24	3A-465	1026	03	08	31	:20	S
JAN 21	21:23:27	3A-466	1026	03	08	31	:20	S
JAN 21	21:23:30	3A-467	1026	03	08	31	:19	S
JAN 21	21:23:35	3A-468	1026	03	08	31	:20	S
JAN 21	21:23:40	3A-469	1026	03	08	31	:19	S
JAN 21	21:23:45	3A-470	1026	03	08	31	:19	S
JAN 22	22:00:34	3A-471	1027	03	08	31	:20	S
JAN 22	22:00:49	3A-472	1027	03	08	31	:19	S
JAN 22	22:11:51	3A-473	1034	06 -1	01A	SC	:59	L
JAN 22	22:11:54	3A-474	1034	06 -1	01A	SC	:19	S
JAN 22	22:11:59	3A-475	1034	06 -1	01A	SC	:59	L
JAN 22	22:12:01	3A-476	1034	06 -1	01A	SC	:19	S
JAN 22	22:22:41	3A-477	1041	SGL		SC	:40	L
JAN 22	22:22:43	3A-478	1041	SGL		SC	:40	L
JAN 22	22:22:44	3A-479	1041	SGL		SC	:09	S
JAN 22	22:22:46	3A-480	1041	SGL		SC	:10	S
JAN 23	23:12:19	3A-481	1050	06 -1	01A	SC	:59	L
JAN 23	23:12:20	3A-482	1050	06 -1	01A	SC	:19	S
JAN 24	24:11:38	3A-483	1065	06 -1	01A	SC	1:00	L
JAN 24	24:11:40	3A-484	1065	06 -1	01A	SC	:19	S
JAN 25	25:12:23	3A-485	1081	06 -1	01A	SC	:59	L
JAN 25	25:12:24	3A-486	1081	06 -1	01A	SC	:19	S
JAN 26	26:13:23	3A-487	1097	06 -1	01A	SC	1:00	L
JAN 26	26:13:24	3A-488	1097	06 -1	01A	SC	:20	S
JAN 26	26:22:35	3A-489	1103	SGL		SC	2:00	L
JAN 26	26:23:18	3A-490	1103	SGL		P77	:06	S
JAN 27	27:22:12	3A-491	1118	17A	28	BSP	1:00	L
JAN 27	27:23:55	3A-492	1119	17A	28	BSP	:20	S
JAN 28	28:11:54	3A-493	1127	06 -1	01A	SC	1:00	L
JAN 28	28:11:56	3A-494	1127	06 -1	01A	SC	:20	S
JAN 29	29:22:08	3A-495	1149	06 -1	01A	SC	:59	L

DATE	TIME	FILM-STRIP	D/N	JOP-ST	BR	TGT	EXP	WVL
JAN 29	29:22:09	3A-496	1149	06 -1	01A	SC	:19	S
JAN 30	30:00:26	3A-497	1150	13	30	VEL	:05	S
JAN 30	30:00:26	3A-498	1150	13	30	VEL	30:44	S
JAN 30	30:20:26	3A-499	1163	SGL		SC	:19	S
JAN 31	31:19:08	3A-500	1178	SGL		SC	:19	S

ENGINEERING DATA BOOK—MSFC

5.0 ENGINEERING DATA BOOK - MSFC

This portion of the Mission Engineering Data Book was originated at MSFC from the telemetered data during the Skylab Missions. The shutter open and shutter close times were GMT corrected and superimposed on this data and the exposure time was computed from these times. In addition, all other ATM instruments operating
Rev A while S082A was recording scientific data are noted.
Also included are pointing information and certain selected orbital or ephemeris data. This data is in the form of a computer printout and is recorded on magnetic tape.

The telemetry system was noisy during the mission and often data was missing from the printouts (dropouts). The telemetry noise caused many false exposure data to appear on the telemetry, while the dropouts caused exposure data lines to be missing. Consequently it was necessary to correct these engineering data using several other sources of information through time correlation.

The corrected EDB (MSFC) has been coordinated with data from the diode array, MSFC quick look data (AUTO SCAN), MSFC and JSC console logs, MSFC Data Book Six, and the JSC EDB. The corrected roll information as provided by IBM under contract with MSFC has
Rev A been incorporated into the computer tabulations. The roll information has been corrected for the SL-4 Mission, only up to day of year 361/13/23 at which time the Skylab Star Tracker malfunctioned.

Rev A The initial IBM issue of these reconstructed values was based on 1950 Ephemeris Data. Additional information provided by IBM updated these values to the 1973 Ephemeris Data. These delta corrections have been incorporated into the computer tabulations.

Rev A The roll values contained in this book are accurate to within 3 arc minutes of the IBM values.

Rev A

S082A EDB PRINTOUT INDEX

OPEN	Complete Greenwich Mean-time when shutter was opened (Column A).
CLOSE	Greenwich Mean-time in minutes, seconds, and milliseconds when shutter was closed (Column B).
EXPOSURE TIME	Difference between shutter OPEN and CLOSE time (Column C).
FRAME COUNT	The film strip number as assigned by NRL (Column D).
WVL	Wavelength - 'G' is grating position and 'M' is the mirror position. 'S' is printed in both columns for Short Wavelength, and 'L' is Long Wavelength (Columns E and F).
MULT	Multiplier - '1' is normal exposure time, '1/4' is normal exposure time divided by four, and '4' is normal exposure time multiplied by four (Column G).
MODE	Operating Mode of Instrument - 'AUTO 1' is Auto 1 Mode, 'AUTO 2' is Auto 2 Mode, 'FLARE' is Flare Mode, and 'MAN' is Manual or Time Mode (Column H).
OP EXP	Operating Experiments - A number in the respective columns indicates the experiment was operating while the shutter was OPEN, 'X' indicates the Instrument assigned to that column was not operating. The columns are assigned as follows: Col I is S-052; Col J is S-054; Col K is S-055; Col L contains operating modes of the S-055 experiments, 'ML' is Line Mirror Mode, 'M3' is 3 Raster Mirror Mode, 'MA' is Auto Mirror Mode; 'GA' is Grating Advance Single Step Mode, 'GS' is Grating Scan Mode, 'G3' is 3 Grating Scan Modes, 'GR' is Grating Reference Mode, a void indicates no mode, BT23 indicates mode unknown; Col M is S-056; Col N is S082B; and Col O is Hα 1.

S082A EDB PRINTOUT INDEX
Page 2

TEMP	Temperature of Instrument - Provide quick check of instrument temperatures when shutter was opened (OP-Column P) and closed (CL-Column Q). 'OK' is printed in the 'OP' column when: 1) the absolute temperatures of the instrument are 70 ± 13°F; 2) the absolute temperature of the grating is 73 ± 10°F; and 3) the differential temperatures are 0 ± 5°F. If any of the temperatures are not within the above described limits, an 'X' is printed in the 'OP' column. If the above measured temperatures vary during the time the shutter was OPEN by less than 1) ±5.4°F for all absolute temperatures, 2) ±6.6°F for the grating, 3) ±0.2°F for the vertical differential temperatures, and 4) ±0.5°F for horizontal differential temperatures, 'OK' is printed in the TEMP 'CL' Column. If these requirements are not met, 'X' is printed in the TEMP 'CL' Column.
ROLL	GAMRR - Roll position is printed in Column R.
MAX PT. EXC.	Maximum Pointing Excursion - The maximum deviation of the Point Control during the shutter OPEN period is printed in these three columns. GAMX, GAMY and GAMRR Point Positions are printed in the respective columns, S, T and U.
NRL BIAS	The alignment bias values for the S082B instrument are printed at S082A shutter OPEN and CLOSE.

ANGLE	'B' (Column V) is the minimum angle (β, Fig. 5-1) from sun-earth line to Skylab orbital plane, and 'E' (Column W) is the minimum angle (α, Fig. 5-2) between Skylab-sun line and nearest forward earth horizon as measured in the vertical plane. Both angles were printed when shutter opened.
ALTITUDE	The altitude (A, Fig. 5-2) of the Skylab in kilometers when shutter was opened (Column X).
Zm	The distance of the viewing line above earth (Zm, Fig. 5-2) in kilometers when the shutter was opened (Column Y). $Z_M = (6378 + A)$ cosine E - 6378 where E is from Column 'W' and A is from Column 'X'. NOTE: Zm is meaningful only for values E between 0 and -1290 arc minutes.
ORBIT NO.	Orbit number (Column Z).

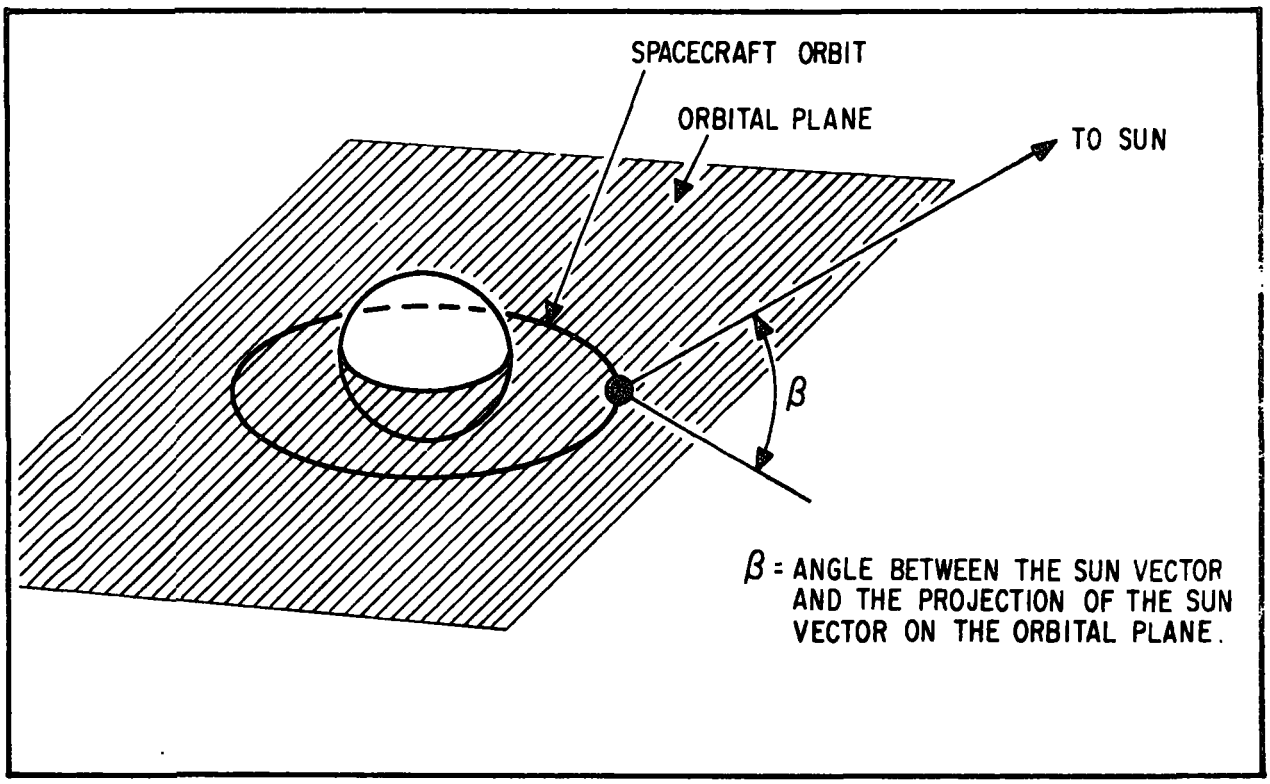

Figure 5-1 Beta Angle

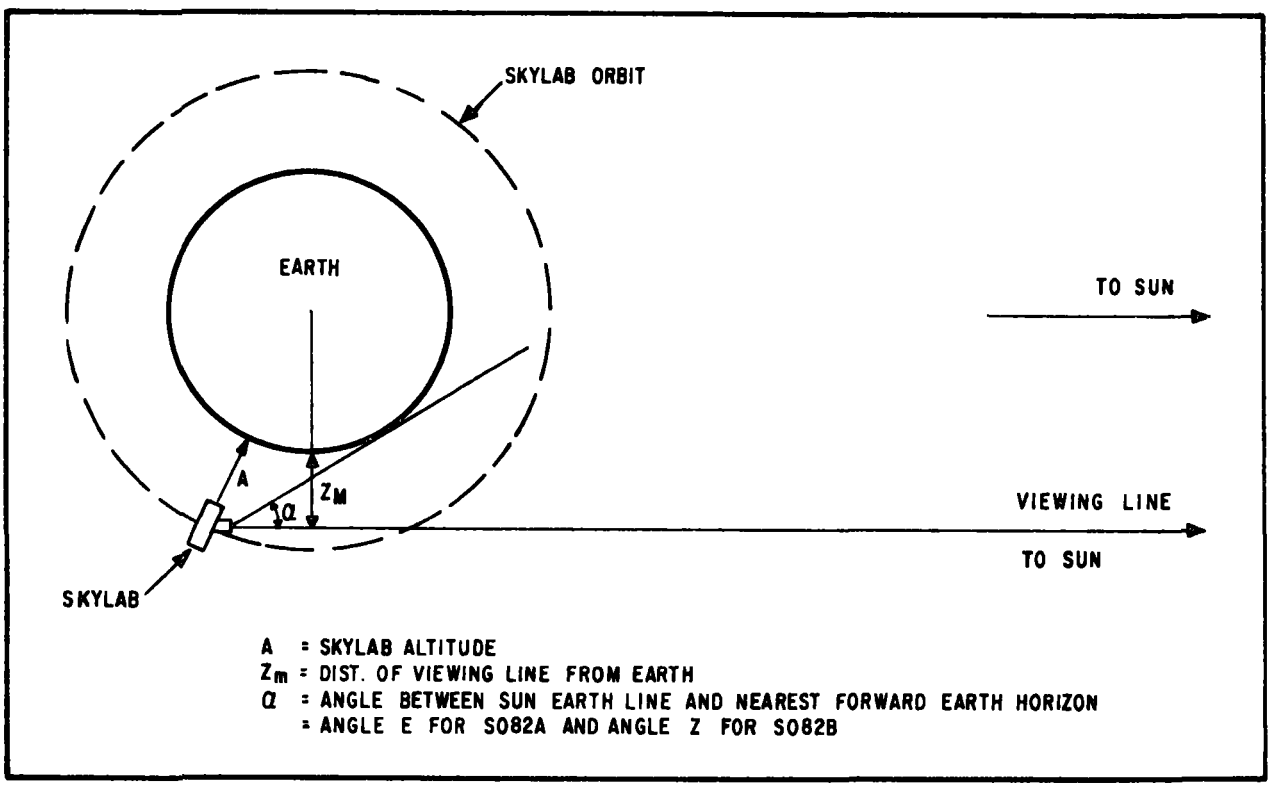

Figure 5-2 Extinction Parameters

SO82A-EDB
INSTRUMENT OPERATION 5- 7-75 AT 9 HOURS 7 MINS 15 SECS
PAGE 1- 12

SHUTTER OPEN (A)	SHUTTER CLOSE (B)	EXPOSURE TIME (C)	FRAME COUNT (D)	WVL -G- (E)	WVL -M- (F)	MULT (G)	MODE (H)	OP EXP (I)	OP EXP (J)	OP EXP (K)	OP EXP (L)	OP EXP (M)	OP EXP (N)	OP EXP (O)	TEMP OP (P)	TEMP CL (Q)
359:20: 0: 3: 57	8: 6:557	0: 3:500	3A-301	S	S	I	MAN	X	Y	5	MA	6	X	HI	OK	OK
360: 5:15: 4: 55	16: 6:303	1: 2:248	3A-302	L	L	I	MAN	X	4	5	G5	6	X	X	OK	OK
360: 5:16:59:219	17:18:718	0:19:499	3A-303	S	S	I	MAN	X	4	5	MA	6	X	X	OK	OK
360:17:24:39:258	24:48:258	0: 9: 0	3A-304	S	S	I	MAN	X	Y	5	MA	6	X	HI	OK	OK
361: 2:39:24:258	40:23:258	0:59: 0	3A-305	L	L	I	MAN	X	4	5	MA	6	X	HI	OK	OK
361: 2:41: 0:258	41:19:258	0:19: 0	3A-306	S	S	I	MAN	X	4	5	MA	6	X	HI	OK	OK
361:13:42: 3:541	46: 2:617	3:59: 76	3A-307	L	L	I	MAN	X	4	5	G5	6	X	HI	OK	OK
361:13:47:17: 58	14:28:558	27:11:500	3A-308	L	L	I	MAN	X	4	5	G3	6	X	HI	OK	OK
361:15:15:11:195	47:10:595	31:59:400	3A-309	S	S	I	MAN	X	4	5	MA	6	B	HI	OK	OK
361:16:46: 2: 72	56: 2: 72	10: 0: 0	3A-310	S	S	I	MAN	X	4	5	G3	6	B	HI	OK	OK
361:16:57: 2:153	20:51: 4	23:48:851	3A-311	L	L	I	MAN	X	4	5	G5	6	B	X	OK	OK
362: 1:55: 1:359	56: 0:609	0:59:250	3A-312	L	L	I	MAN	X	4	5	MA	6	X	HI	OK	OK
362: 1:56:29:109	56:48:609	0:19:500	3A-313	S	S	I	MAN	X	4	5	MA	6	X	HI	OK	OK
362:14:29: 2:658	30: 1:908	0:59:250	3A-314	L	L	I	MAN	2	4	5	MA	6	X	HI	OK	OK
362:14:32:52:705	33:11:787	0:19: 82	3A-315	S	S	I	MAN	2	4	5	MA	6	X	HI	OK	OK
362:19:32:30:257	32:40: 7	0: 9:750	3A-316	S	S	I	MAN	X	X	5		6	X	HI	OK	OK
363:13:36:11:308	37:10: 58	0:58:750	3A-317	L	L	I	MAN	X	4	5	MA	6	X	HI	OK	OK
363:13:37:55:308	38:14: 58	0:18:750	3A-318	S	S	I	MAN	X	4	5	MA	6	X	HI	OK	OK
364:13: 7:47:529	8:46:858	0:59:329	3A-319	L	L	I	MAN	X	4	5	MA	6	X	HI	OK	OK
364:13: 9: 6:857	9:25:856	0:18:999	3A-320	S	S	I	MAN	X	4	5	MA	6	X	HI	OK	OK

5082A-EDB
INSTRUMENT OPERATION 5- 7-75 AT 9 HOURS 7 MINS 15 SECS
PAGE 2- 12

FRAME COUNT	GAMRR (ARCMINS)	MAX PT EXC (ARCSEC) GAMX	GAMY	(ARCMINS) GAMRR	--NRL BIAS-- (ARCSEC) GXBI	GYBI	ANGLE (ARCMINS) -R- OPEN	-E- OPEN	ALTITUDE (KM)	Z(M) (KM)	ORBIT NUMBER
(D)	(R)	(S)	(T)	(U)			(V)	(W)	(X)	(Y)	(Z)
3A-301	-10393.00				82.50	28.75	935.65	1621.59	435.13	-308.80	3252
		.000	.000	.000	82.50	28.75					
3A-302	4.00				82.50	28.75	864.36	4214.92	450.38	-1927.28	3257
		.000	.000	.660	82.50	28.75					
3A-303	4.00				82.50	28.75	864.38	4049.67	449.00	-1687.16	3257
		.000	.000	.660	82.50	28.75					
3A-304	1.00				92.50	25.00	767.49	2233.57	459.13	-933.90	3264
		.000	.000	.989	92.50	25.00					
3A-305	.00				92.50	25.00	691.29	1244.06	454.85	454.77	3270
		.000	.000	.330	92.50	25.00					
3A-306	.00				92.50	25.00	690.69	1692.78	457.17	404.18	3270
		.000	.000	.000	92.50	25.00					
3A-307	-4079.26				92.50	25.00	595.36	3543.91	459.87	-2862.91	3277
		.000	.000	.000	92.50	25.00					
3A-308	-4079.59				92.50	25.00	594.76	4541.96	456.26	-2423.39	3277
		.000	.000	.000	92.50	25.00					
3A-309	-4181.43				92.50	25.00	582.05	3494.52	459.84	-924.95	3278
		.000	.000	.000	92.50	25.00					
3A-310	-4180.11				92.50	25.00	581.13	2099.91	436.30	222.67	3278
		.000	.000	.000	92.50	25.00					
3A-311	-4179.78				92.50	25.00	568.90	4790.00	451.80	-2853.00	3279
		.000	.000	.000	92.50	25.00					
3A-312	-4.94				92.50	25.00	488.63	652.49	452.09	329.43	3284
		.000	.000	.000	92.50	25.00					
3A-313	-4.94				92.50	25.00	488.33	880.40	453.53	411.99	3284
		.000	.000	.000	92.50	25.00					
3A-314	2.64				92.50	25.00	372.00	2500.00	459.70	26.95	3291
		.000	.000	.000	92.50	25.00					
3A-315	2.64				92.50	25.00	372.00	3180.00	459.80	-568.40	3292
		.000	.000	.000	92.50	25.00					
3A-316	.33				92.50	25.00	326.82	2890.69	438.98	-1832.32	3294
		.000	.000	.000	92.50	25.00					
3A-317	.66				92.50	25.00	153.08	-145.96	448.06	441.91	3305
		.000	.000	.660	92.50	25.00					
3A-318	.66				92.50	25.00	152.81	84.58	449.69	58.02	3305
		.000	.000	.000	92.50	25.00					
3A-319	-5360.00				92.50	25.00	-83.91	2725.67	459.10	-1579.60	3320
		.000	.000	.330	92.50	25.00					
3A-320	-5360.00				92.50	25.00	-84.40	3190.00	458.60	-579.00	3320
		.000	.000	.330	92.50	25.00					

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INSTRUMENT OPERATION 5- 7-75 AT 9 HOURS 7 MINS 15 SECS
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SHUTTER OPEN (A)	SHUTTER CLOSE (B)	EXPOSURE TIME (C)	FRAME COUNT (D)	AVL -G- (E)	AVL -M- (F)	(G)	MULT MODE (H)	(I)	(J)	OP EXP (K)	(L)	(M)	(N)	(O)	TEMP OP (P)	TEMP CL (Q)
364:13:14:33:680	15:32:958	0:59:278	3A-321	L	L	1	MAN	X	4	5	G3	6	X	HI	OK	OK
364:13:16:11:708	16:30:841	0:19:133	3A-322	S	S	1	MAN	X	4	5	G3	6	X	HI	OK	OK
365:21:43:29:108	43:57:858	0:29:750	3A-323	S	S	1	MAN	X	X	5	MA	6	X	HI	OK	OK
365:21:50:29:358	50:58:458	0:29:500	3A-324	S	S	1	MAN	X	X	5	MA	6	X	HI	OK	OK
366: 2:13:29:758	14:29: 8	0:59:250	3A-325	L	L	1	MAN	X	4	5	MA	6	X	HI	OK	OK
366: 2:14:59: 8	15:17: 8	0:19: 0	3A-326	S	S	1	MAN	X	4	5	MA	6	X	HI	OK	OK
366:14:40:37: 58	41:36:308	0:59:250	3A-327	L	L	1	MAN	X	4	5	MA	6	X	HI	OK	OK
366:14:42: 5:308	42:24:306	0:19: 0	3A-328	S	S	1	MAN	X	4	5	MA	6	X	HI	OK	OK
367: 2:12:10:808	12:29:425	0:18:617	3A-329	S	S	1	MAN	X	X	5	MA	6	X	HI	OK	OK
367:15:29:15:558	30:15: 58	0:59:500	3A-330	L	L	1	MAN	X	4	5	MA	6	X	HI	OK	OK
367:15:30:36:558	30:56: 58	0:19:500	3A-331	S	S	1	MAN	X	4	5	MA	6	X	HI	OK	OK
368:13:16: 3:358	17: 2:358	0:59: 0	3A-332	L	L	1	MAN	X	4	5	MA	6	X	HI	OK	OK
368:13:17:14:608	17:33:358	0:18:750	3A-333	S	S	1	MAN	X	4	5	MA	6	X	HI	OK	OK
368:18:35:20: 6	36:19:420	0:59:414	3A-334	S	S	1	MAN	X	X	5		6	X	HI	OK	OK
369:12:32:36:158	33:35:408	0:59:250	3A-335	L	L	1	MAN	X	4	5	MA	6	X	HI	OK	OK
369:12:33:47:900	34: 7:408	0:19:508	3A-336	S	S	1	MAN	X	4	5	MA	6	X	HI	OK	OK
369:15:39:43:158	40:11:906	0:28:750	3A-337	S	S	1	MAN	X	X	5		6	X	HI	OK	OK
370:12: 7:16:894	8:15:892	0:58:998	3A-338	L	L	1	MAN	X	4	5		6	X	HI	OK	OK
370:12: 8:33: 57	8:51:891	0:18:834	3A-339	S	S	1	MAN	X	4	5		6	X	HI	OK	OK
370:19:36: 1:257	39:20:757	1:19:500	3A-340	L	L	1	MAN	X	4	5	MA	6	X	HI	OK	OK

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INSTRUMENT OPERATION 5- 7-75 AT 9 HOURS 7 MINS 15 SECS
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FRAME COUNT	GAMRR (ARCMINS)	MAX PT EXC (ARCSEC) GAMX	GAMY	(ARCMINS) GAMRR	-NRL BIAS- (ARCSEC) GXBI	GYBI	ANGLE (ARCMINS) -B- OPEN	-E- OPEN	ALTITUDE (KM)	Z(M) (KM)	ORBIT NUMBER
(D)	(R)	(S)	(T)	(U)			(V)	(W)	(X)	(Y)	(Z)
3A-321	-1.32				92.50	25.00	-85.10	4330.00	455.00	-209.80	3320
		.000	.000	.659	92.50	25.00					
3A-322	-1.98				92.50	25.00	-85.30	4790.00	452.90	-285.10	3320
		.000	.000	1.320	92.50	25.00					
3A-323	-36.00				92.50	25.00	-425.00	2280.00	458.60	163.20	3339
		.000	.000	.000	92.50	25.00					
3A-324	-35.70				92.50	25.00	-426.00	3860.00	455.40	-1400.00	3339
		.000	.000	.000	92.50	25.00					
3A-325	.99				92.50	25.00	-472.00	75.80	451.40	52.29	3342
		.000	.000	.000	92.50	25.00					
3A-326	.99				92.50	25.00	-472.00	304.00	452.70	191.10	3342
		.000	.000	.000	92.50	25.00					
3A-327	3.96				92.50	25.00	-606.70	340.54	419.73	453.23	3349
		.000	.000	.000	92.50	25.00					
3A-328	3.96				92.50	25.00	-607.39	793.57	455.38	392.01	3349
		.000	.000	.000	92.50	25.00					
3A-329	-5399.24				92.50	25.00	-732.15	1317.49	436.52	434.66	3356
		.000	.000	.000	92.50	25.00					
3A-330	.99				92.50	25.00	-879.93	-254.00	450.14	431.39	3364
		.000	.000	.000	92.50	25.00					
3A-331	.99				92.50	25.00	-880.27	101.92	451.51	69.58	3364
		.000	.000	.000	92.50	25.00					
3A-332	.33				92.50	25.00	-1130.00	148.00	452.70	99.44	3377
		.000	.000	.000	92.50	25.00					
3A-333	.33				92.50	25.00	-1130.00	366.00	453.80	224.10	3377
		.000	.000	.000	92.50	25.00					
3A-334	1300.87				92.50	25.00	-1184.77	1460.03	437.78	-167.74	3381
		.000	.000	.990	92.50	25.00					
3A-335	.33				92.50	25.00	-1390.59	-365.00	450.02	411.56	3391
		.000	.000	.000	92.50	25.00					
3A-336	.33				92.50	25.00	-1390.94	15.87	452.28	452.17	3391
		.000	.000	.000	92.50	25.00					
3A-337	-5398.58				92.50	25.00	-1426.38	-97.27	450.76	448.03	3393
		.000	.000	.000	92.50	25.00					
3A-338	.33				92.50	25.00	-1664.42	2879.08	452.74	-292.15	3406
		.000	.000	.000	92.50	25.00					
3A-339	.33				92.50	25.00	-1664.55	3040.62	451.98	-446.21	3406
		.000	.000	.000	92.50	25.00					
3A-340	-5399.24				92.50	25.00	-1750.33	-51.92	452.10	451.36	3410
		.000	.000	.000	92.50	25.00					

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INSTRUMENT OPERATION 5- 7-75 AT 9 HOURS 7 MINS 15 SECS
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SHUTTER OPEN (A)	SHUTTER CLOSE (B)	EXPOSURE TIME (C)	FRAME COUNT (D)	WVL -G- (E)	WVL -M- (F)	MULT (G)	MODE (H)	OP EXP (I)	(J)	(K)	(L)	(M)	(N)	(O)	TEMP OP (P)	TEMP CL (Q)
371:14:16:13:808	19:13:558	0:59:750	3A-341	L	L	1	MAN	X	4	5		6	X	HI	OK	OK
371:14:19:27:558	19:46:558	0:19: 0	3A-342	S	S	1	MAN	X	4	5	GS	6	X	HI	OK	OK
372:13:37: 1:858	38: 5:108	1: 3:250	3A-343	L	L	1	MAN	X	4	5	MA	6	X	HI	OK	OK
372:13:36:19:858	39:38:108	0:19:250	3A-344	S	S	1	MAN	X	4	5	MA	6	X	HI	OK	OK
373:13: 6:19:808	7:20:308	1: 0:500	3A-345	L	L	1	MAN	X	4	5	MA	6	X	HI	OK	OK
373:13: 7:41: 58	8: 0: 58	0:19: 0	3A-346	S	S	1	MAN	X	4	5	MA	6	X	HI	OK	OK
374:12:14:31:108	15:30:358	0:59:250	3A-347	L	L	1	MAN	X	4	5	MA	6	X	HI	OK	OK
374:12:15:40:608	16: 0:358	0:19:750	3A-348	S	S	1	MAN	X	X	5	MA	6	X	HI	OK	OK
375: 0:56:43:432	57:43: 0	0:59:568	3A-349	L	L	1	MAN	X	X	5	MA	6	X	HI	OK	OK
375: 0:57:55:750	58:15: 0	0:19:250	3A-350	S	S	1	MAN	X	X	5	MA	6	X	HI	OK	OK
375:14:45:13:908	46:32:908	1:19: 0	3A-351	L	L	1	MAN	X	X	5		6	X	HI	OK	OK
375:19:25:30:633	25:50: 49	0:19:416	3A-352	S	S	1	MAN	X	X	5	MA	6	X	HI	OK	OK
375:22:23:48:208	24:47:458	0:59:250	3A-353	L	L	1	MAN	X	4	5	MA	6	X	HI	OK	OK
375:22:24:59:708	25:18:458	0:18:750	3A-354	S	S	1	MAN	X	4	5	MA	6	X	HI	OK	OK
376:13:57:27:458	58:26:958	0:59:500	3A-355	L	L	1	MAN	X	4	5	MA	6	X	HI	OK	OK
376:13:59: 4:458	59:23:958	0:19:500	3A-356	S	S	1	MAN	X	4	5	MA	6	X	HI	OK	OK
376:16:16:41:262	17: 0:512	0:19:250	3A-357	S	S	1	MAN	X	4	5	MA	6	B	HI	OK	OK
376:20:26: 4:708	26:26:708	0:20: 0	3A-358	S	S	1	MAN	X	4	5	ML	6	X	HI	OK	OK
377: 0:49:32:758	50:32: 8	0:59:250	3A-359	L	L	1	MAN	X	4	5	MA	6	X	HI	OK	OK
377: 0:50:59: 8	51:17: 8	0:19: 0	3A-360	S	S	1	MAN	X	4	5	MA	6	X	HI	OK	OK

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INSTRUMENT OPERATION 5- 7-75 AT 9 HOURS 7 MINS 15 SECS
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FRAME COUNT	GAMRR (ARCMINS)	MAX PT EXC (ARCSEC) GAMX	GAMY	(ARCMINS) GAMRR	--NRL BIAS-- (ARCSEC) GXBI	GYBI	ANGLE (ARCMINS) -R- OPEN	-E- OPEN	ALTITUDE (KM)	Z(M) (KM)	ORBIT NUMBER
(O)	(R)	(S)	(T)	(U)			(V)	(W)	(X)	(Y)	(Z)
3A-341	-.33				92.50	25.00	-1967.78	187.03	453.24	443.12	3421
		.000	.000	.990	92.50	25.00					
3A-342	-.33				92.50	25.00	-1968.14	380.24	453.91	231.31	3421
		.000	.000	.000	92.50	25.00					
3A-343	.00				92.50	25.00	-2239.80	270.65	453.35	172.71	3435
		.000	.000	.000	92.50	25.00					
3A-344	.00				92.50	25.00	-2240.15	453.05	453.83	266.44	3435
		.000	.000	.000	92.50	25.00					
3A-345	.66				92.50	25.00	-2514.07	1934.52	451.34	-601.77	3451
		.000	.000	.330	92.50	25.00					
3A-346	.33				92.50	25.00	-2514.23	2072.96	450.74	258.83	3451
		.000	.000	.000	92.50	25.00					
3A-347	.66				95.00	18.75	-2780.10	201.02	452.53	440.85	3463
		.000	.000	.990	95.00	18.75					
3A-348	.66				95.00	18.75	-2780.00	359.00	452.80	220.30	3463
		.000	.000	.000	95.00	18.75					
3A-349	1.98				95.00	18.75	-2925.22	2229.33	446.65	-938.76	3471
		.000	.000	.000	95.00	18.75					
3A-350	1.98				95.00	18.75	-2925.27	2300.37	446.15	-1025.48	3471
		.000	.000	.000	95.00	18.75					
3A-351	3.63				95.00	18.75	-3081.25	977.66	451.25	176.93	3479
		.000	.000	.000	95.00	18.75					
3A-352	.66				95.00	18.75	-3133.39	986.44	450.92	429.90	3482
		.000	.000	.000	95.00	18.75					
3A-353	-.33				95.00	18.75	-3165.22	-77.65	451.16	449.42	3484
		.000	.000	.000	95.00	18.75					
3A-354	-.33				95.00	18.75	-3165.56	87.05	451.51	59.79	3484
		.000	.000	.000	95.00	18.75					
3A-355	.00				95.00	18.75	-3335.33	-8.49	451.27	451.24	3493
		.000	.000	.000	95.00	18.75					
3A-356	.00				95.00	18.75	-3335.99	251.04	451.35	161.14	3493
		.000	.000	.000	95.00	18.75					
3A-357	-1068.84				95.00	18.75	-3360.08	137.41	435.23	90.65	3495
		.000	.000	.000	95.00	18.75					
3A-358	-500.00				95.00	18.75	-3404.92	1714.99	445.64	-386.00	3497
		.000	.000	.000	95.00	18.75					
3A-359	.99				95.00	18.75	-3450.66	-127.60	450.87	446.16	3500
		.000	.000	.000	95.00	18.75					
3A-360	.99				95.00	18.75	-3450.99	115.21	450.98	78.19	3500
		.000	.000	.000	95.00	18.75					

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INSTRUMENT OPERATION 5- 7-75 AT 9 HOURS 7 MINS 15 SECS
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SHUTTER OPEN (A)	SHUTTER CLOSE (B)	EXPOSURE TIME (C)	FRAME COUNT (D)	WVL -G- (E)	WVL -M- (F)	MULT (G)	MODE (H)	OP EXP (I)	(J)	(K)	(L)	(M)	(N)	(O)	TEMP OP (P)	TEMP CL (Q)
377:19:29:19:216			3A-361	S	S	1	MAN	X	4	5	GS	6	X	HI	OK	
	29:58:796	0:39:580														OK
378: 0: 8: 3:258			3A-362	L	L	1	MAN	X	4	5	MA	6	X	HI	OK	
	9: 2: 8	0:58:750														OK
378: 0:10:16:508			3A-363	S	S	1	MAN	X	4	5	MA	6	X	HI	OK	
	10:36: 8	0:19:500														OK
378:14: 6:39:508			3A-364	L	L	1	MAN	X	4	5	MA	6	X	HI	OK	
	7:37:758	0:59:250														OK
378:14: 7:49:758			3A-365	S	S	1	MAN	X	4	5	MA	6	X	HI	OK	
	8: 8:758	0:19: 0														OK
378:16:20:30: 8			3A-366	S	S	1	MAN	X	4	5	ML	6	X	HI	OK	
	20:49:255	0:19:250														OK
378:20:35:26: 7			3A-367	S	S	1	MAN	X	X	5	MA	6	X	HI	OK	
	36: 6: 7	0:40: 0														OK
378:20:46: 2:625			3A-368	L	L	1	MAN	X	X	5	MA	6	X	HI	OK	
	48:42:868	2:40:243														OK
379:13:25:12:808			3A-369	L	L	1	MAN	X	4	5	MA	6	X	HI	OK	
	26:11:808	0:59: 0														OK
379:13:26:24: 58			3A-370	S	S	1	MAN	X	4	5	MA	6	X	HI	OK	
	26:43:808	0:19:750														OK
380:12:47:22:558			3A-371	L	L	1	MAN	X	4	5	MA	6	X	HI	OK	
	48:21:558	0:59: 0														OK
380:12:48:42:808			3A-372	S	S	1	MAN	X	4	5	MA	6	X	HI	OK	
	49: 1:558	0:18:750														OK
380:13:17:51:805			3A-373	L	L	1	MAN	X	4	5		6	X	HI	OK	
	18:50:634	0:58:829														OK
380:13:18:59:884			3A-374	S	S	1	MAN	X	4	5		6	X	HI	OK	
	19:18:633	0:18:749														OK
380:14:25:24: 58			3A-375	S	S	1	MAN	X	4	5	ML	6	B	HI	OK	
	27:14:808	1:50:750														OK
380:14:28:26:808			3A-376	S	S	1	MAN	X	4	5	ML	6	X	HI	OK	
	28:46:308	0:19:500														OK
380:22:19: 8: 66			3A-377	S	S	1	MAN	X	X	5	MA	6	X	HI	OK	
	19:17:148	0: 9: 92														OK
380:22:19:26:648			3A-378	S	S	1	MAN	X	X	5	MA	6	X	HI	OK	
	19:46:147	0:19:499														OK
380:22:19:53:646			3A-379	S	S	1	MAN	X	X	5	MA	6	X	HI	OK	
	20:33:143	0:39:497														OK
380:22:21: 4:892			3A-380	L	L	1	MAN	X	4	5	MA	6	X	HI	OK	
	21:34:140	0:29:248														OK

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FRAME COUNT	GAMRR (ARCMINS)	MAX PT EXC (ARCSEC) GAMX	GAMY	(ARCMINS) GAMRR	-NRL BIAS- (ARCSEC) GXBI	GYBI	ANGLE (ARCMINS) -B- OPEN	-E- OPEN	ALTITUDE (KM)	Z(M) (KM)	ORBIT NUMBER
(D)	(R)	(S)	(T)	(U)			(V)	(W)	(X)	(Y)	(Z)
3A-361	-8999.28				95.00	18.75	-3641.33	-66.32	450.28	449.00	3511
		.000	.000	.000	95.00	18.75					
3A-362	.33				95.00	18.75	-3686.44	-166.32	450.12	442.13	3514
		.000	.000	.000	95.00	18.75					
3A-363	.33				95.00	18.75	-3687.05	53.24	449.99	36.99	3514
		.000	.000	.000	95.00	18.75					
3A-364	.33				95.00	18.75	-3816.91	-283.01	449.62	426.50	3522
		.000	.000	.000	95.00	18.75					
3A-365	.33				95.00	18.75	-3817.22	-163.38	449.66	441.95	3522
		.000	.000	.000	95.00	18.75					
3A-366	-914.59				95.00	18.75	-3835.98	906.88	440.98	408.39	3524
		.000	.000	.000	95.00	18.75					
3A-367	-3410.00				95.00	18.75	-3870.00	1100.00	445.10	438.40	3526
		.000	.000	.000	95.00	18.75					
3A-368	-3410.00				95.00	18.75	-3870.00	1520.00	445.00	424.00	3526
		.000	.000	.000	95.00	18.75					
3A-369	-.33				95.00	18.75	-4009.45	-419.71	448.79	397.97	3536
		.000	.000	.000	95.00	18.75					
3A-370	-.33				95.00	18.75	-4009.74	-297.09	448.71	423.23	3536
		.000	.000	.000	95.00	18.75					
3A-371	-5398.25				95.00	18.75	-4157.11	-295.38	447.10	421.91	3550
		.000	.000	.990	95.00	18.75					
3A-372	-5397.26				95.00	18.75	-4157.33	-159.59	446.80	439.45	3550
		.000	.000	.990	95.00	18.75					
3A-373	3.96				95.00	18.75	-4157.79	1207.46	445.23	444.74	3551
		.000	.000	.990	95.00	18.75					
3A-374	2.97				95.00	18.75	-4157.87	1187.63	444.84	443.78	3551
		.000	.000	.990	95.00	18.75					
3A-375	-229.39				95.00	18.75	-4165.74	73.15	445.65	50.17	3551
		.000	.000	.000	95.00	18.75					
3A-376	-229.39				95.00	18.75	-4166.06	312.27	444.87	193.53	3551
		.000	.000	.000	95.00	18.75					
3A-377	-2459.02				95.00	18.75	-4200.14	585.45	444.07	318.06	3556
		.000	.000	.000	95.00	18.75					
3A-378	-2458.03				95.00	18.75	-4200.14	585.45	444.07	318.06	3556
		.000	.000	.990	95.00	18.75					
3A-379	-2459.02				95.00	18.75	-4200.14	585.45	444.07	318.06	3556
		.000	.000	1.320	95.00	18.75					
3A-380	-2458.36				95.00	18.75	-4200.03	718.35	444.23	363.59	3556
		.000	.000	.990	95.00	18.75					

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INSTRUMENT OPERATION 5- 7-75 AT 9 HOURS 7 MINS 15 SECS
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SHUTTER OPEN (A)	SHUTTER CLOSE (B)	EXPOSURE TIME (C)	FRAME COUNT (D)	NVL -G- (E)	NVL -M- (F)	(G)	MULT MODE (H)	(I)	(J)	(K)	UP EXP (L)	(M)	(N)	(O)	TEMP OP (P)	TEMP CL (Q)
380:22:21:49:889	22:49:136	0:59:247	3A-381	L	L	I	MAN	X	X	5	MA	6	X	HI	OK	OK
380:22:23: 3:385	25: 3:131	1:59:746	3A-382	L	L	I	MAN	X	X	5	MA	6	B	HI	OK	OK
381:12: 7:22: 58	8:21:558	0:59:500	3A-383	L	L	I	MAN	X	4	5	G3	6	X	HI	OK	OK
381:12: 8:38: 58	8:57:558	0:19:500	3A-384	S	S	I	MAN	X	4	5	MA	6	X	HI	OK	OK
382:14:34:38:958	35:38:708	0:59:750	3A-385	L	L	I	MAN	X	4	5	MA	6	X	HI	OK	OK
382:14:36: 2:958	36:22:708	0:19:750	3A-386	S	S	I	MAN	X	4	5	MA	6	X	HI	OK	OK
382:19:44:19:627	44:57:710	0:39: 0	3A-387	S	S	I	MAN	X	4	5	MA	6	X	HI	OK	OK
382:19:45:26:209	48: 5:703	2:39:494	3A-388	L	L	I	MAN	X	4	5	G5	6	X	HI	OK	OK
382:19:56:13:503	58:52:674	0:39:166	3A-389	S	S	I	MAN	X	4	5	ML	6	X	HI	OK	OK
382:20:10:38: 55	11:17:638	0:39:583	3A-390	S	S	I	MAN	X	4	5	MA	6	X	HI	OK	OK
382:20:46:15:628	47:34:543	1:18:915	3A-391	S	S	I	MAN	X	4	5	MA	6	X	HI	OK	OK
383:14: 5:29:377	6:28:206	0:58:829	3A-392	L	L	I	MAN	X	4	5	MA	6	X	HI	OK	OK
383:14: 6:57:456	7:16:204	0:18:748	3A-393	S	S	I	MAN	X	4	5	MA	6	X	HI	OK	OK
383:18:52:25:807	52:45:307	0:19:500	3A-394	S	S	I	MAN	X	X	5	MA	6	X	HI	OK	OK
383:18:53:31:557	56:10:442	2:38:885	3A-395	S	S	I	MAN	X	X	5	MA	6	X	HI	OK	OK
384:11:43:40: 83	44:39:158	0:59: 75	3A-396	L	L	I	MAN	X	4	5	MA	6	X	HI	OK	OK
384:11:46: 1:241	46:20:990	0:19:749	3A-397	S	S	I	MAN	X	4	5	MA	6	X	HI	OK	OK
384:13:24:12:389	24:31:722	0:19:333	3A-398	S	S	I	MAN	X	X	5		6	X	HI	OK	OK
384:14:55:10:396	56: 9:394	0:58:998	3A-399	L	L	I	MAN	X	X	5		6	X	HI	OK	OK
384:16:29:33:643	29:53:142	0:19:499	3A-400	S	S	I	MAN	X	X	5	MA	6	X	HI	OK	OK

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INSTRUMENT OPERATION 5- 7-75 AT 9 HOURS 7 MINS 15 SECS
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FRAME COUNT	GAMRR (ARCMINS)	MAX PT EXC (ARCSEC) GAMA	GAMY	(ARCMINS) GAMRR	-NRL BIAS- (ARCSEC) GXBI	GYBI	ANGLE (ARCMINS) -A- OPEN	-E- OPEN	ALTITUDE (KM)	Z(M) (KM)	ORBIT NUMBER
(D)	(R)	(S)	(T)	(U)			(V)	(W)	(X)	(Y)	(Z)
3A-381	-2458.36				95.00	18.75	-4200.03	716.35	444.23	363.59	3556
		.000	.000	.990	95.00	18.75					
3A-382	-2456.36				95.00	18.75	-4199.88	838.98	444.54	396.34	3556
		.000	.000	.990	95.00	18.75					
3A-383	.99				95.00	18.75	-4240.30	-391.63	445.59	401.36	3564
		.000	.000	.330	95.00	18.75					
3A-384	.99				95.00	18.75	-4240.00	-272.00	445.30	423.95	3564
		.000	.000	.000	95.00	18.75					
3A-385	1.65				95.00	16.25	-4239.59	-517.57	444.14	366.97	3580
		.000	.000	.000	95.00	16.25					
3A-386	1.65				95.00	16.25	-4240.00	-374.00	443.80	403.47	3580
		.000	.000	.000	95.00	16.25					
3A-387	-737.00				95.00	16.25	-4230.00	1160.00	442.90	440.90	3583
		.990	.200	.990	95.00	16.25					
3A-388	-737.00				95.00	16.25	-4230.00	1160.00	442.90	440.10	3583
		.000	.000	.000	95.00	16.25					
3A-389	-738.00				95.00	16.25	-4230.00	727.00	426.90	355.90	3584
		.000	.000	.000	95.00	16.25					
3A-390	-738.00				95.00	16.25	-4230.00	-195.00	424.60	413.66	3584
		.000	.000	.000	95.00	16.25					
3A-391	-3300.00				95.00	16.25	-4224.40	-627.95	444.10	330.60	3584
		.000	.000	.000	95.00	16.25					
3A-392	4.94				95.00	16.25	-4150.00	194.00	445.40	126.70	3594
		.000	.000	.000	95.00	16.25					
3A-393	4.94				95.00	16.25	-4150.00	274.00	445.80	173.00	3594
		.000	.000	.000	95.00	16.25					
3A-394	-5970.00				95.00	16.25	-4130.00	717.00	447.40	365.10	3597
		.000	.000	.000	95.00	16.25					
3A-395	-5970.00				95.00	16.25	-4130.00	785.00	447.40	384.60	3597
		.000	.000	.000	95.00	16.25					
3A-396	1.96				95.00	16.25	-4017.66	-534.65	442.98	360.65	3607
		.000	.000	.660	95.00	16.25					
3A-397	1.96				95.00	16.25	-4017.33	-333.04	443.95	411.96	3607
		.000	.000	.660	95.00	16.25					
3A-398	-10799.14				95.00	16.25	-4004.93	41.94	445.98	29.13	3608
		.000	.000	.000	95.00	16.25					
3A-399	-10798.48				95.00	16.25	-3993.65	-159.16	445.04	437.73	3609
		.000	.000	.000	95.00	16.25					
3A-400	-10798.81				95.00	16.25	-3981.59	-67.02	445.37	444.07	3610
		.000	.000	.000	95.00	16.25					

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INSTRUMENT OPERATION 5- 7-75 AT 9 HOURS 7 MINS 15 SECS
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SHUTTER OPEN (A)	SHUTTER CLOSE (B)	EXPOSURE TIME (C)	FRAME COUNT (D)	WVL -G- (E)	WVL -M- (F)	MULT (G)	MODE (H)	OP EXP (I)	(J)	(K)	(L)	(M)	(N)	(O)	TEMP OP (P)	TEMP CL (Q)
384:18: 3:30:970			3A-401	L	L	1	MAN	X	4	5	MA	6	X	HI	OK	
	4:29:884	0:58:914														OK
384:19:41:32:408			3A-402	S	S	1	MAN	X	4	5	MA	6	X	HI	OK	
	41:51:908	0:19:500														OK
384:19:47:32:408			3A-403	S	S	1	MAN	X	4	5	MA	6	X	HI	OK	
	47:51:908	0:19:500														OK
384:19:53:32:172			3A-404	S	S	1	MAN	X	4	5	MA	6	X	HI	OK	
	53:51:587	0:19:415														OK
384:19:59:33:154			3A-405	S	S	1	MAN	X	4	5	MA	6	X	HI	OK	
	59:52:569	0:19:415														OK
384:20: 5:33:139			3A-406	S	S	1	MAN	X	4	5	MA	6	X	HI	OK	
	5:52:556	0:19:417														OK
384:20: 9:33:158			3A-407	S	S	1	MAN	X	4	5	MA	6	X	HI	OK	
	9:52:658	0:19:500														OK
384:20:11:33:158			3A-408	S	S	1	MAN	X	4	5	MA	6	X	HI	OK	
	11:52:658	0:19:500														OK
384:20:13:33:158			3A-409	S	S	1	MAN	X	4	5	MA	6	X	HI	OK	
	13:52:658	0:19:500														OK
384:20:15:33:158			3A-410	S	S	1	MAN	X	4	5	MA	6	X	HI	OK	
	15:52:658	0:19:500														OK
384:20:17:32:908			3A-411	S	S	1	MAN	X	4	5	MA	6	X	HI	OK	
	17:52:658	0:19:750														OK
384:20:19:33:158			3A-412	S	S	1	MAN	X	4	5	MA	6	X	HI	OK	
	19:52:658	0:19:500														OK
384:20:20:33:408			3A-413	S	S	1	MAN	X	4	5	MA	6	X	HI	OK	
	20:52:658	0:19:250														OK
384:20:21: 3:158			3A-414	S	S	1	MAN	X	4	5	MA	6	X	HI	OK	
	21:22:658	0:19:500														OK
384:20:21:32:158			3A-415	S	S	1	MAN	X	4	5	MA	6	X	HI	OK	
	21:51:658	0:19:500														OK
384:20:22: 2:908			3A-416	S	S	1	MAN	X	4	5	MA	6	X	HI	OK	
	22:22:658	0:19:750														OK
384:20:22:32:908			3A-417	S	S	1	MAN	X	4	5	MA	6	X	HI	OK	
	22:52:658	0:19:750														OK
384:20:23: 3:158			3A-418	S	S	1	MAN	X	4	5	MA	6	X	HI	OK	
	23:22:658	0:19:500														OK
384:20:23:33:159			3A-419	S	S	1	MAN	X	4	5	MA	6	X	HI	OK	
	23:54:158	0:21: 0														OK
384:20:24: 3:158			3A-420	S	S	1	MAN	X	4	5	MA	6	X	HI	OK	
	24:22:658	0:19:500														OK

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INSTRUMENT OPERATION 5- 7-75 AT 9 HOURS 7 MINS 15 SECS
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FRAME COUNT	GAMRR (ARCMINS)	MAX PT EXC (ARCSEC) GAMA	GAMY	(ARCMINS) GAMRR	-NRL BIAS- (ARCSEC) GXBI	GYBI	ANGLE (ARCMINS) -R- OPEN	-E- OPEN	ALTITUDE (KM)	Z(M) (KM)	ORBIT NUMBER
(O)	(R)	(S)	(T)	(U)			(V)	(W)	(X)	(Y)	(Z)
3A-401	-10800.00				95.00	16.25	-3969.31	-59.56	445.72	444.69	3611
		.000	.000	.660	95.00	16.25					
3A-402	-10800.00				95.00	16.25	-3960.00	371.00	447.40	224.70	3612
		.000	.000	.000	95.00	16.25					
3A-403	-10800.00				95.00	16.25	-3950.00	877.00	447.40	407.00	3612
		.000	.000	.990	95.00	16.25					
3A-404	-10800.00				95.00	16.25	-3950.00	1260.00	443.70	443.60	3612
		.000	.000	.000	95.00	16.25					
3A-405	-10800.00				95.00	16.25	-3950.00	1430.00	436.90	425.90	3613
		.000	.000	.660	95.00	16.25					
3A-406	-10800.00				95.00	16.25	-3950.00	1370.00	429.60	423.90	3613
		.000	.000	.660	95.00	16.25					
3A-407	-10800.00				95.00	16.25	-3950.00	1190.00	425.90	425.70	3613
		.000	.000	.000	95.00	16.25					
3A-408	-10800.00				95.00	16.25	-3950.00	1070.00	424.80	418.50	3613
		.000	.000	.000	95.00	16.25					
3A-409	-10800.00				95.00	16.25	-3950.00	935.00	424.20	400.70	3613
		.000	.000	.000	95.00	16.25					
3A-410	-10800.00				95.00	16.25	-3950.00	779.00	424.10	368.20	3613
		.000	.000	.000	95.00	16.25					
3A-411	-10800.00				95.00	16.25	-3950.00	611.00	424.60	317.90	3613
		.000	.000	.000	95.00	16.25					
3A-412	-10800.00				95.00	16.25	-3950.00	433.00	425.60	247.20	3613
		.000	.000	.000	95.00	16.25					
3A-413	-10800.00				95.00	16.25	-3950.00	342.00	426.30	203.80	3613
		.000	.000	.330	95.00	16.25					
3A-414	-10800.00				95.00	16.25	-3950.00	249.00	427.00	154.90	3613
		.000	.000	.000	95.00	16.25					
3A-415	-10800.00				95.00	16.25	-3950.00	249.00	427.00	154.90	3613
		.000	.000	.000	95.00	16.25					
3A-416	-10800.00				95.00	16.25	-3950.00	155.00	427.90	100.60	3613
		.000	.000	.000	95.00	16.25					
3A-417	-10800.00				95.00	16.25	-3950.00	155.00	427.90	100.60	3613
		.000	.000	.000	95.00	16.25					
3A-418	-10800.00				95.00	16.25	-3950.00	60.70	428.80	40.98	3613
		.000	.000	.000	95.00	16.25					
3A-419	-10800.00				95.00	16.25	-3950.00	60.70	428.80	40.98	3613
		.000	.000	.000	95.00	16.25					
3A-420	-10800.00				95.00	16.25	-3950.00	-38.60	429.80	429.37	3613
		.000	.000	.000	95.00	16.25					

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INSTRUMENT OPERATION 5- 7-75 AT 9 HOURS 7 MINS 15 SECS
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SHUTTER OPEN (A)	SHUTTER CLOSE (B)	EXPOSURE TIME (C)	FRAME COUNT (D)	WVL -G- (E)	WVL -M- (F)	MULT (G)	MODE (H)	OP EXP (I)	(J)	(K)	(L)	(M)	(N)	(O)	TEMP OP (P)	TEMP CL (Q)
384:20:24:33:158	24:52:658	0:19:500	3A-421	S	S	1	MAN	X	4	5	MA	6	X	HI	OK	OK
384:20:25: 3:908	25:23:658	0:19:750	3A-422	S	S	1	MAN	X	4	5	MA	6	X	HI	OK	OK
384:20:25:33:158	25:52:658	0:19:500	3A-423	S	S	1	MAN	X	4	5	MA	6	X	HI	OK	OK
384:20:26: 3:158	26:22:658	0:19:500	3A-424	S	S	1	MAN	X	4	5	MA	6	X	HI	OK	OK
384:20:26:33:158	26:52:658	0:19:500	3A-425	S	S	1	MAN	X	4	5	MA	6	X	HI	OK	OK
384:20:27: 3:158	27:22:658	0:19:500	3A-426	S	S	1	MAN	X	4	5	MA	6	X	HI	OK	OK
384:21:15:10:658	15:29:658	0:19: 0	3A-427	S	S	1	MAN	X	X	5	ML	6	X	HI	OK	OK
384:22:49:31:307	49:50:658	0:19: 0	3A-428	S	S	1	MAN	X	X	5	ML	6	X	HI	OK	OK
385: 0:18:19:908	19:19: 58	0:59:250	3A-429	L	L	1	MAN	X	4	5	MA	6	X	HI	OK	OK
385: 1:56:42:558	57: 1:808	0:19:250	3A-430	S	S	1	MAN	X	X	5	ML	6	X	HI	OK	OK
385: 3:22: 8:558	23: 7:558	0:59: 0	3A-431	L	L	1	MAN	X	X	5	ML	X	X	X	OK	OK
385: 5:24:47:614	25: 7:446	0:19:832	3A-432	L	L	1	AUTO 2	X	X	5	ML	X	X	X	OK	OK
385: 5:25: 9:446	25:19:363	0: 9:917	3A-433	S	S	1	AUTO 2	X	X	5	ML	X	X	X	OK	OK
385: 5:25:21:362	26:27:277	1: 5:915	3A-434	L	L	1	AUTO 2	X	X	5	ML	X	X	X	OK	OK
385: 8: 2:16:762	2:36:596	0:19:834	3A-435	L	L	1	AUTO 2	X	X	5	ML	X	X	X	OK	OK
385: 8: 2:38:596	2:48:511	0: 9:915	3A-436	S	S	1	AUTO 2	X	X	5	ML	X	X	X	OK	OK
385: 8: 2:50:511	3:54:842	1: 4:331	3A-437	L	L	1	AUTO 2	X	X	5	ML	X	X	X	OK	OK
385:11:33:35:908	33:54:908	0:19: 0	3A-438	S	S	1	MAN	X	4	5	ML	6	X	HI	OK	OK
385:12:44:57:322	45:56:485	0:59:163	3A-439	L	L	1	MAN	X	4	5	MA	6	X	HI	OK	OK
385:12:46:23:650	46:42:484	0:18:834	3A-440	S	S	1	MAN	X	4	5	MA	6	X	HI	OK	OK

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INSTRUMENT OPERATION 5- 7-75 AT 9 HOURS 7 MINS 15 SECS
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FRAME COUNT	GAMRR (ARCMINS)	MAX PT EXC (ARCSEC) GAMX	GAMY	(ARCMINS) GAMRR	-NRL BIAS- (ARCSEC) GXB1	GYB1	ANGLE (ARCMINS) -R- OPEN	-E- OPEN	ALTITUDE (KM)	Z(M) (KM)	ORBIT NUMBER
(O)	(R)	(S)	(T)	(U)			(V)	(X)	(X)	(Y)	(Z)
3A-421	-10800.00				95.00	16.25	-3950.00	-85.80	429.80	427.68	3613
		.000	.000	.000	95.00	16.25					
3A-422	-10800.00				95.00	16.25	-3950.00	-133.00	430.90	425.80	3613
		.000	.000	.000	95.00	16.25					
3A-423	-10800.00				95.00	16.25	-3950.00	-180.00	430.90	421.57	3613
		.000	.000	.000	95.00	16.25					
3A-424	-10800.00				95.00	16.25	-3950.00	-227.00	432.00	417.16	3613
		.000	.000	.000	95.00	16.25					
3A-425	-10800.00				95.00	16.25	-3950.00	-273.00	432.00	410.54	3613
		.000	.000	.000	95.00	16.25					
3A-426	-10800.00				95.00	16.25	-3950.00	-320.00	433.10	403.61	3613
		.000	.000	.000	95.00	16.25					
3A-427	-10800.00				95.00	16.25	-3940.00	433.00	447.40	254.60	3613
		.000	.000	.000	95.00	16.25					
3A-428	-10800.00				95.00	16.25	-3930.00	495.00	447.60	282.70	3614
		.000	.000	.000	95.00	16.25					
3A-429	-10798.15				95.00	16.25	-3918.22	89.62	446.48	444.15	3615
		.000	.000	.000	95.00	16.25					
3A-430	10761.23				95.00	16.25	-3903.78	530.11	447.73	297.76	3616
		.000	.000	.000	95.00	16.25					
3A-431	10581.94				95.00	16.25	-3892.56	-159.26	445.44	438.12	3617
		.000	.000	.000	95.00	16.25					
3A-432	10755.96				95.00	16.25	-3873.70	1474.63	430.05	412.59	3618
		.000	.000	.000	95.00	16.25					
3A-433	10755.96				95.00	16.25	-3873.71	1445.81	429.01	415.22	3618
		.000	.000	.000	95.00	16.25					
3A-434	10755.96				95.00	16.25	-3873.71	1445.81	429.01	415.22	3618
		.000	.000	.000	95.00	16.25					
3A-435	10572.71				95.00	16.25	-3851.98	-152.21	445.66	438.97	3620
		.000	.000	.000	95.00	16.25					
3A-436	10572.05				95.00	16.25	-3851.98	-115.59	445.66	441.80	3620
		.000	.000	.000	95.00	16.25					
3A-437	10572.71				95.00	16.25	-3851.98	-95.62	445.66	443.02	3620
		.000	.000	.000	95.00	16.25					
3A-438	10795.18				95.00	16.25	-3818.41	1571.43	434.61	401.92	3622
		.000	.000	.000	95.00	16.25					
3A-439	-10800.00				95.00	16.25	-3810.00	21.40	447.00	15.01	3622
		.000	.000	.660	95.00	16.25					
3A-440	-10800.00				95.00	16.25	-3810.00	226.00	447.70	146.00	3622
		.000	.000	.000	95.00	16.25					

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INSTRUMENT OPERATION 5- 7-75 AT 9 HOURS 7 MINS 15 SECS
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SHUTTER OPEN (A)	SHUTTER CLOSE (B)	EXPOSURE TIME (C)	FRAME COUNT (D)	WVL -G- (E)	WVL -M- (F)	(G)	MULT MODE (H)	(I)	(J)	OF EXP (K)	(L)	(M)	(N)	(O)	TEMP OP (P)	TEMP CL (Q)
385:14:21:36:806			3A-441	S	S	I	MAN	X	4	5		6	X	HI	OK	
	21:54:222	0:17:416														OK
385:14:43:41:908			3A-442	S	S	I	MAN	X	X	5	MA	6	B	HI	OK	
	44: 1:158	0:19:250														OK
385:15:49:54:394			3A-442	L	L	I	MAN	X	X	5		6	X	HI	OK	
	50:53:390	0:58:996														OK
385:17:21: 2:808			3A-443	S	S	I	MAN	X	X	5	MA	6	X	HI	OK	
	21:21:641	0:18:833														OK
385:19:37: 0:517			3A-444	L	L	I	MAN	X	4	5		6	X	HI	OK	
	38: 0:265	0:59:748														OK
385:20:28:48:658			3A-445	S	S	I	MAN	X	X	5		6	X	HI	OK	
	29: 8:158	0:19:500														OK
385:22: 1:36:908			3A-446	L	L	I	MAN	X	X	5	ML	6	X	HI	OK	
	2:35:908	0:59: 0														OK
385:22: 3:59:908			3A-447	L	L	I	MAN	X	X	5	ML	6	X	HI	OK	
	4:58:908	0:59: 0														OK
385:23:36:54:153			3A-448	S	S	I	MAN	X	X	5		6	X	HI	OK	
	37:13:658	0:19:500														OK
386: 1: 7:33:409			3A-449	L	L	I	MAN	X	4	5	MA	6	X	HI	OK	
	8:33:659	1: 0:250														OK
386:12: 2:47:774			3A-450	L	L	I	MAN	X	4	5	MA	6	X	HI	OK	
	3:46:523	0:58:749														OK
386:12: 3:58:357			3A-451	S	S	I	MAN	X	4	5	MA	6	X	HI	OK	
	4:17:522	0:19:165														OK
386:23:15:53:809			3A-452	S	S	I	MAN	X	4	5	ML	6	B	HI	OK	
	16:12:641	0:18:832														OK
386:23:17:43:470			3A-453	S	S	I	FLARE	X	4	5	ML	6	B	HI	OK	
	17:45:886	0: 2:416														OK
386:23:17:47:886			3A-454	S	S	I	FLARE	X	4	5	ML	6	B	HI	OK	
	17:57:802	0: 9:916														OK
386:23:17:59:802			3A-455	S	S	I	FLARE	X	4	5	ML	6	B	HI	OK	
	18:39:633	0:39:831														OK
386:23:18:41:550			3A-456	L	L	I	FLARE	X	4	5	ML	6	B	HI	OK	
	18:46:550	0: 5: 0														OK
386:23:18:48:549			3A-457	L	L	I	FLARE	X	4	5	ML	6	B	HI	OK	
	19: 8:466	0:19:917														OK
386:23:19:10:382			3A-458	L	L	I	FLARE	X	4	5	ML	6	B	HI	OK	
	20:30: 45	1:19:663														OK
386:23:20:31:962			3A-459	S	S	I	FLARE	X	4	5	ML	6	B	HI	OK	
	20:34:462	0: 2:500														OK

NOTE: 3A-442 was a double exposure.

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INSTRUMENT OPERATION 5- 7-75 AT 9 HOURS 7 MINS 15 SECS
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FRAME COUNT	GAMRR (ARCMINS)	MAX PT EXC (ARCSEC) GAMA	GAMY	(ARCMINS) GAMRR	-NRL BIAS- (ARCSEC) GXBI	GYBI	ANGLE (ARCMINS) -B- OPEN	-E- OPEN	ALTITUDE (KM)	Z(M) (KM)	ORBIT NUMBER
(D)	(R)	(S)	(T)	(U)			(V)	(W)	(X)	(Y)	(Z)
3A-441	-10800.00				95.00	16.25	-3790.00	398.00	446.00	238.20	3624
		.000	.000	.000	95.00	16.25					
3A-442	-10800.00				95.00	16.25	-3790.00	1580.00	430.20	394.80	3624
		.000	.000	.000	95.00	16.25					
3A-442	-10800.00				95.00	16.25	-3780.00	-57.20	446.40	445.45	3624
		.000	.000	.990	95.00	16.25					
3A-443	-10800.00				95.00	16.25	-3770.00	-287.00	445.90	422.13	3625
		.000	.000	.000	95.00	16.25					
3A-444	-10799.80				95.00	16.25	-3745.68	699.63	426.24	347.46	3627
		.000	.000	2.160	95.00	16.25					
3A-445	-10799.14				95.00	16.25	-3737.38	-171.94	446.00	437.47	3627
		.000	.000	.000	95.00	16.25					
3A-446	-5400.56				95.00	16.25	-3722.49	-228.78	445.94	430.83	3628
		.000	.000	.330	95.00	16.25					
3A-447	-10793.53				95.00	16.25	-3721.97	27.82	446.83	19.45	3628
		.000	.000	6.260	95.00	16.25					
3A-448	-10799.47				95.00	16.25	-3706.96	-15.35	446.78	446.71	3629
		.000	.000	.000	95.00	16.25					
3A-449	-10799.14				95.00	16.25	-3692.39	-306.35	445.77	418.69	3630
		.000	.000	.000	95.00	16.25					
3A-450	-10799.80				95.00	16.25	-3583.03	-172.30	447.10	438.52	3637
		.000	.000	.000	95.00	16.25					
3A-451	-10799.80				95.00	16.25	-3582.74	55.82	447.48	38.63	3637
		.000	.000	.000	95.00	16.25					
3A-452	-9608.35				95.00	16.25	-3464.51	1811.40	437.56	343.15	3643
		.000	.000	.000	95.00	16.25					
3A-453	-9608.02				95.00	16.25	-3464.32	1887.40	435.10	312.87	3643
		.000	.000	.000	95.00	16.25					
3A-454	-9608.02				95.00	16.25	-3464.32	1887.40	435.10	312.87	3643
		.000	.000	.000	95.00	16.25					
3A-455	-9608.02				95.00	16.25	-3464.32	1887.40	435.10	312.87	3643
		.000	.000	.000	95.00	16.25					
3A-456	-9608.35				95.00	16.25	-3464.25	1911.48	433.90	301.90	3643
		.000	.000	.000	95.00	16.25					
3A-457	-9608.02				95.00	16.25	-3464.25	1911.48	433.90	301.90	3643
		.000	.000	.000	95.00	16.25					
3A-458	-9608.35				95.00	16.25	-3464.20	1925.91	432.74	294.48	3643
		.000	.000	.000	95.00	16.25					
3A-459	-9608.35				95.00	16.25	-3464.16	1930.55	431.64	290.96	3643
		.000	.000	.000	95.00	16.25					

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INSTRUMENT OPERATION 5- 7-75 AT 9 HOURS 7 MINS 15 SECS
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SHUTTER OPEN (A)	SHUTTER CLOSE (B)	EXPOSURE TIME (C)	FRAME COUNT (D)	WVL -G- (E)	WVL -M- (F)	MULT (G)	MODE (H)	OP EXP (I)	(J)	(K)	(L)	(M)	(N)	(O)	TEMP OP (P)	TEMP CL (Q)
386:23:20:36:462	20:46:378	0: 9:916	3A-460	S	S	1	FLARE	X	4	5	ML	6	B	HI	OK	OK
386:23:20:48:295	21:29:126	0:39:831	3A-461	S	S	1	FLARE	X	4	5	ML	6	B	HI	OK	OK
386:23:21:30:126	21:40: 43	0: 9:917	3A-462	S	S	1	FLARE	X	4	5	ML	6	B	HI	OK	OK
386:23:21:42: 43	22:21:958	0:39:915	3A-463	S	S	1	FLARE	X	4	5	ML	6	B	HI	OK	OK
386:23:22:23:958	23: 4:458	0:40:500	3A-464	S	S	1	FLARE	X	4	5	ML	6	B	HI	OK	OK
386:23:24:12:458	24:31:708	0:19:250	3A-465	S	S	1	MAN	X	4	5	ML	6	B	HI	OK	OK
386:23:27:26:958	27:46:708	0:19:750	3A-466	S	S	1	MAN	X	4	5	ML	6	X	HI	OK	OK
386:23:30:24:958	30:43:708	0:18:750	3A-467	S	S	1	MAN	X	4	5	ML	6	X	HI	OK	OK
386:23:35:27:208	35:46:708	0:19:500	3A-468	S	S	1	MAN	X	4	5	ML	6	X	HI	OK	OK
386:23:40:48:405	41: 7:569	0:19:164	3A-469	S	S	1	MAN	X	4	5	ML	6	B	HI	OK	OK
386:23:45:58:221	46:17:554	0:19:333	3A-470	S	S	1	MAN	X	4	5	ML	6	B	HI	OK	OK
387: 0:34:23:958	34:43:458	0:19:500	3A-471	S	S	1	MAN	X	4	5	MA	6	B	HI	OK	OK
387: 0:49:22: 45	49:41:376	0:19:331	3A-472	S	S	1	MAN	X	4	5	MA	6	B	HI	OK	OK
387:11:51:44:508	52:44: 8	0:59:500	3A-473	L	L	1	MAN	X	4	5	MA	6	X	HI	OK	OK
387:11:54:39: 8	54:58: 8	0:19: 0	3A-474	S	S	1	MAN	X	4	5	MA	6	X	HI	OK	OK
387:11:57:43: 8	0:42: 8	0:59: 0	3A-475	L	L	1	MAN	X	4	5		6	X	HI	OK	OK
387:12: 1: 0:487	1:19:904	0:19:417	3A-476	S	S	1	MAN	X	4	5		6	X	HI	OK	OK
387:22:41: 4:507	41:44:257	0:39:750	3A-477	L	L	1	MAN	X	X	5		6	X	HI	OK	OK
387:22:43:44:757	44:26:257	0:39:500	3A-478	L	L	1	MAN	X	X	5		6	X	HI	OK	OK
387:22:44:35:257	44:44:257	0: 9: 0	3A-479	S	S	1	MAN	X	X	5		6	X	HI	OK	OK

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INSTRUMENT OPERATION 5- 7-75 AT 9 HOURS 7 MINS 15 SECS
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FRAME COUNT	GAMRR (ARCMINS)	MAX PT EXC (ARCSEC) GAMA	GAMY	(ARCMINS) GAMRR	-NRL BIAS- (ARCSEC) GXB1	GYB1	ANGLE (ARCMINS) -R- OPEN	-E- OPEN	ALTITUDE (KM)	Z(M) (KM)	ORBIT NUMBER
(P)	(Q)	(S)	(T)	(U)			(V)	(W)	(X)	(Y)	(Z)
3A-460	-9608.02				95.00	16.25	-3464.16	1930.55	431.64	290.96	3643
		.000	.000	.000	95.00	16.25					
3A-461	-9608.34				95.00	16.25	-3464.16	1930.55	431.64	290.96	3643
		.000	.000	.000	95.00	16.25					
3A-462	-9608.35				95.00	16.25	-3464.13	1925.32	430.61	291.49	3643
		.000	.000	.000	95.00	16.25					
3A-463	-9608.35				95.00	16.25	-3464.13	1925.32	430.61	291.49	3643
		.000	.000	.000	95.00	16.25					
3A-464	-9608.35				95.00	16.25	-3464.11	1910.25	429.66	296.00	3643
		.000	.000	.000	95.00	16.25					
3A-465	-9608.35				95.00	16.25	-3464.08	1851.25	428.07	315.73	3643
		.000	.000	.000	95.00	16.25					
3A-466	-9608.66				95.00	16.25	-3464.02	1695.13	426.56	362.68	3643
		.000	.000	.000	95.00	16.25					
3A-467	-9608.66				95.00	16.25	-3463.88	1468.63	426.21	408.88	3643
		.000	.000	.000	95.00	16.25					
3A-468	-9608.68				95.00	16.25	-3463.29	974.16	428.08	409.86	3643
		.000	.000	.000	95.00	16.25					
3A-469	-9608.35				95.00	16.25	-3462.17	390.59	432.14	229.53	3644
		.000	.000	.000	95.00	16.25					
3A-470	-9608.35				95.00	16.25	-3460.62	-342.92	436.78	402.90	3644
		.000	.000	.000	95.00	16.25					
3A-471	-10254.99				95.00	16.25	-3451.56	506.00	448.94	375.12	3644
		.000	.000	.000	95.00	16.25					
3A-472	-10255.32				95.00	16.25	-3447.90	1858.07	436.59	325.76	3644
		.000	.000	.000	95.00	16.25					
3A-473	-5393.97				95.00	16.25	-3330.12	1946.36	427.47	278.16	3651
		.000	.000	.000	95.00	16.25					
3A-474	-5393.64				95.00	16.25	-3330.02	1757.98	426.53	344.51	3651
		.000	.000	.000	95.00	16.25					
3A-475	-10799.14				95.00	16.25	-3329.58	1293.81	427.49	426.13	3651
		.000	.000	.000	95.00	16.25					
3A-476	-10799.14				95.00	16.25	-3329.27	1069.76	428.65	421.57	3651
		.910	.200	.660	95.00	16.25					
3A-477	-2003.54				95.00	16.25	-3209.90	2166.97	429.21	176.48	3657
		.000	.000	.000	95.00	16.25					
3A-478	8802.85				95.00	16.25	-3209.85	2102.84	427.89	207.46	3657
		.000	.000	.000	95.00	16.25					
3A-479	8802.95				95.00	16.25	-3209.83	2054.53	427.41	230.18	3657
		.000	.000	.000	95.00	16.25					

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INSTRUMENT OPERATION 5- 7-75 AT 9 HOURS 7 MINS 15 SECS
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SHUTTER OPEN (A)	SHUTTER CLOSE (B)	EXPOSURE TIME (C)	FRAME COUNT (D)	WVL -G- (E)	WVL -M- (F)	MULT (G)	MODE (H)	UP EXP (I)	(J)	(K)	(L)	(M)	(N)	(O)	TEMP OP (P)	TEMP CL (Q)
387:22:46:12:507			3A-480	S	S	1	MAN	X	X	5		6	X	HI	OK	
	46:22:257	0: 9:750														OK
388:12:19:36:358			3A-481	L	L	1	MAN	X	4	5		6	X	HI	OK	
	20:35:858	0:59:500														OK
388:12:20:47:608			3A-482	S	S	1	MAN	X	4	5		6	X	HI	OK	
	21: 6:858	0:19:250														OK
389:11:38:58:658			3A-483	L	L	1	MAN	X	4	5	MA	6	X	HI	OK	
	39:58:570	0:59:912														OK
389:11:40: 9:654			3A-484	S	S	1	MAN	X	4	5	MA	6	X	HI	OK	
	40:28:569	0:18:915														OK
390:12:23: 7: 48			3A-485	L	L	1	MAN	X	4	5	MA	6	X	HI	OK	
	24: 5:963	0:58:915														OK
390:12:24:18:295			3A-486	S	S	1	MAN	X	4	5	MA	6	X	HI	OK	
	24:37:962	0:19:667														OK
391:13:23:32:220			3A-487	L	L	1	MAN	X	4	5	G3	6	X	HI	OK	
	24:31:800	0:59:580														OK
391:13:24:44:216			3A-488	S	S	1	MAN	X	4	5	G3	6	X	HI	OK	
	25: 3:798	0:19:582														OK
391:22:35: 5: 7			3A-489	L	L	1	MAN	X	4	5	MA	6	X	HI	OK	
	37: 4:507	1:59:500														OK
391:23:16:34:669			3A-490	S	S	1	MAN	X	X	5	MA	6	X	HI	OK	
	18:40:836	0: 6:607														OK
392:22:12: 2:948			3A-491	L	L	1	MAN	X	X	5	MA	6	X	HI	OK	
	13: 2:446	0:59:250														OK
392:23:55:38:358			3A-492	S	S	1	MAN	X	4	5	MA	6	X	HI	OK	
	55:58:108	0:19:750														OK
393:11:54:39:736			3A-493	L	L	1	MAN	X	4	5	MA	6	X	HI	OK	
	55:39:233	0:59:497														OK
393:11:56: 5:565			3A-494	S	S	1	MAN	X	4	5	MA	6	X	HI	OK	
	56:25:232	0:19:667														OK
394:22: 8: 3: 7			3A-495	L	L	1	MAN	X	4	5		6	X	HI	OK	
	9: 2:507	0:59:500														OK
394:22: 9:17:507			3A-496	S	S	1	MAN	X	4	5		6	X	HI	OK	
	9:36:507	0:19: 0														OK
395: 0:26:12:574			3A-497	S	S	1	MAN	X	4	5	MA	6	X	X	OK	
	26:17:574	0: 5: 0														OK
395: 0:26:19:574			3A-498	S	S	1	MAN	X	4	5	M3	X	X	X	OK	
	57: 3:758	30:44:184														OK
395:20:26:11:751			3A-499	S	S	1	MAN	X	X	5		6	X	HI	OK	
	26:31:250	0:19:499														OK

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INSTRUMENT OPERATION 5- 7-75 AT 9 HOURS 7 MINS 15 SECS
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FRAME COUNT	GAMRR (ARCMINS)	MAX PT EXC (ARCSEC) GAMX	GAMY	(ARCMINS) GAMRR	-NRL BIAS- (ARCSEC) GXBI	GYBI	ANGLE (ARCMINS) -R- OPEN	-E- OPEN	ALTITUDE (KM)	Z(M) (KM)	ORBIT NUMBER
(D)	(R)	(S)	(T)	(U)			(V)	(W)	(X)	(Y)	(Z)
3A-480	-2000.90				95.00	16.25	-3209.75	1927.94	426.83	284.69	3657
		.000	.000	.000	95.00	16.25					
3A-481	10799.47				95.00	16.25	-3055.69	543.86	449.16	363.90	3664
		.000	.000	.000	95.00	16.25					
3A-482	10799.47				95.00	16.25	-3055.35	685.29	448.84	355.79	3666
		.000	.000	.000	95.00	16.25					
3A-483	-10798.48				95.00	16.25	-2785.13	772.74	448.66	382.07	3680
		.000	.000	.000	95.00	16.25					
3A-484	-10798.48				95.00	16.25	-2784.79	925.83	448.10	417.30	3680
		.000	.000	.000	95.00	16.25					
3A-485	-10800.00				95.00	16.25	-2490.00	-501.00	449.40	377.03	3694
		.000	.000	.000	95.00	16.25					
3A-486	-10800.00				95.00	16.25	-2490.00	-298.00	449.70	424.06	3695
		.000	.000	.000	95.00	16.25					
3A-487	-10800.00				95.00	16.25	-2190.00	947.00	447.90	420.90	3710
		.000	.000	.000	95.00	16.25					
3A-488	-10800.00				95.00	16.25	-2190.00	1130.00	447.10	81.70	3710
		.000	.000	.000	95.00	16.25					
3A-489	-5400.00				95.00	16.25	-2082.40	-408.50	449.80	401.60	3715
		.000	.000	.660	95.00	16.25					
3A-490	-2160.00				95.00	16.25	-2070.00	1100.00	435.60	430.60	3716
		.000	.000	.000	95.00	16.25					
3A-491	-10800.00				95.00	16.25	-1800.00	3020.00	436.10	-460.50	3729
		.000	.000	.000	95.00	16.25					
3A-492	-10800.00				95.00	16.25	-1780.00	3530.00	430.30	-1033.00	3730
		.000	.000	1.320	95.00	16.25					
3A-493	-10799.80				95.00	16.25	-1630.71	-232.49	450.24	434.60	3738
		.000	.000	.000	95.00	16.25					
3A-494	-10799.80				95.00	16.25	-1629.63	265.62	449.68	169.07	3738
		.000	.000	.000	95.00	16.25					
3A-495	-10799.80				95.00	16.25	-1216.27	478.45	449.08	276.15	3758
		.000	.000	.000	95.00	16.25					
3A-496	-10799.80				95.00	16.25	-1215.93	694.35	448.48	358.52	3758
		.000	.000	.000	95.00	16.25					
3A-497	-9266.70				95.00	16.25	-1188.83	-130.60	438.18	433.42	3760
		.000	.000	.000	95.00	16.25					
3A-498	-5400.56				95.00	16.25	-1188.71	-156.00	438.16	431.14	3760
		.000	.000	.000	95.00	16.25					
3A-499	-10800.00				95.00	16.25	-950.00	2540.00	435.60	-51.96	3772
		.000	.000	.000	95.00	16.25					

S082A-EDB
INSTRUMENT OPERATION 5- 7-75 AT 9 HOURS 7 MINS 15 SECS
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SHUTTER OPEN (A)	SHUTTER CLOSE (B)	EXPOSURE TIME (C)	FRAME COUNT (D)	WVL -G- (E)	WVL -M- (F)	MULT (G)	MODE (H)	OP EXP (I)	OP EXP (J)	OP EXP (K)	OP EXP (L)	OP EXP (M)	OP EXP (N)	OP EXP (O)	TEMP OP (P)	TEMP CL (Q)
394:19: 8:52: 57	9:11: 57	0:19: 0	34-500	S	S	I	MAN	X	X	5		A	X	HI	OK	OK

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INSTRUMENT OPERATION 5- 7-75 AT 9 HOURS 7 MINS 15 SECS
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FRAME COUNT	GAMRR (ARCMINS)	MAX PT EXC (ARCSEC)		(ARCMINS)	--NRL BIAS-- (ARCSEC)		ANGLE (ARCMINS)		ALTITUDE (KM)	Z(M) (KM)	ORBIT NUMBER
		GAMA	GAMY	GAMRR	GXBI	GYBI	-R- OPEN	-E- OPEN			
(D)	(R)	(S)	(T)	(U)			(V)	(W)	(X)	(Y)	(Z)
3A-500	-10799.80				95.00	16.25	-679.13	-297.04	450.01	424.53	3785
		.000	.000	.000	95.00	16.25					

TEMPERATURE DATA — MSFC

6.0 TEMPERATURE DATA - MSFC

The temperature data was originated at MSFC from the telemetered data during the Skylab Missions. This data is a computer tabulation which has been corrected by coordination with other sources of information. All columns are entered below the respective measurement numbers and the time of each entry is recorded in the left hand column. An entry in each column is made at each SHUTTER OPEN and approximately each five (5) minutes during the time period the shutter remains open. Entries are not made more often than four (4) minute intervals, consequently not all "Shutter Open" will have associated temperature data. This data is provided in the form of a computer printout and is recorded on magnetic tape.

S082A TEMPERATURE

Column	Description
Time	Greenwich Mean Time of Entry
REAR (C090)	Absolute Temperature, Rear Center Base
CENT (C091)	Absolute Temperature, Center Base
FNT (C092)	Absolute Temperature, Front Center Base
REAR (C095)	Absolute Temperature, Rear Center, Right Side
CENT (C096)	Absolute Temperature, Center, Left Side
FNT (C197)	Absolute Temperature, Front Center, Left Side
GRATING (C200)	Absolute Temperature, Grating, Lower Edge
F. CENT (C201)	Differential Temperature, Front Center, Lid to Base
CENT (C202)	Differential Temperature, Center, Lid to Base
R. CENT (C203)	Differential Temperature, Rear Center, Lid to Base
F. CENT (C204)	Differential Temperature, Front Center, Side to Side
CENT (C205)	Differential Temperature, Center, Side to Side
R. CENT (C206)	Differential Temperature, Rear Center, Side to Side

See Figure 6-1 for locations of measurements.

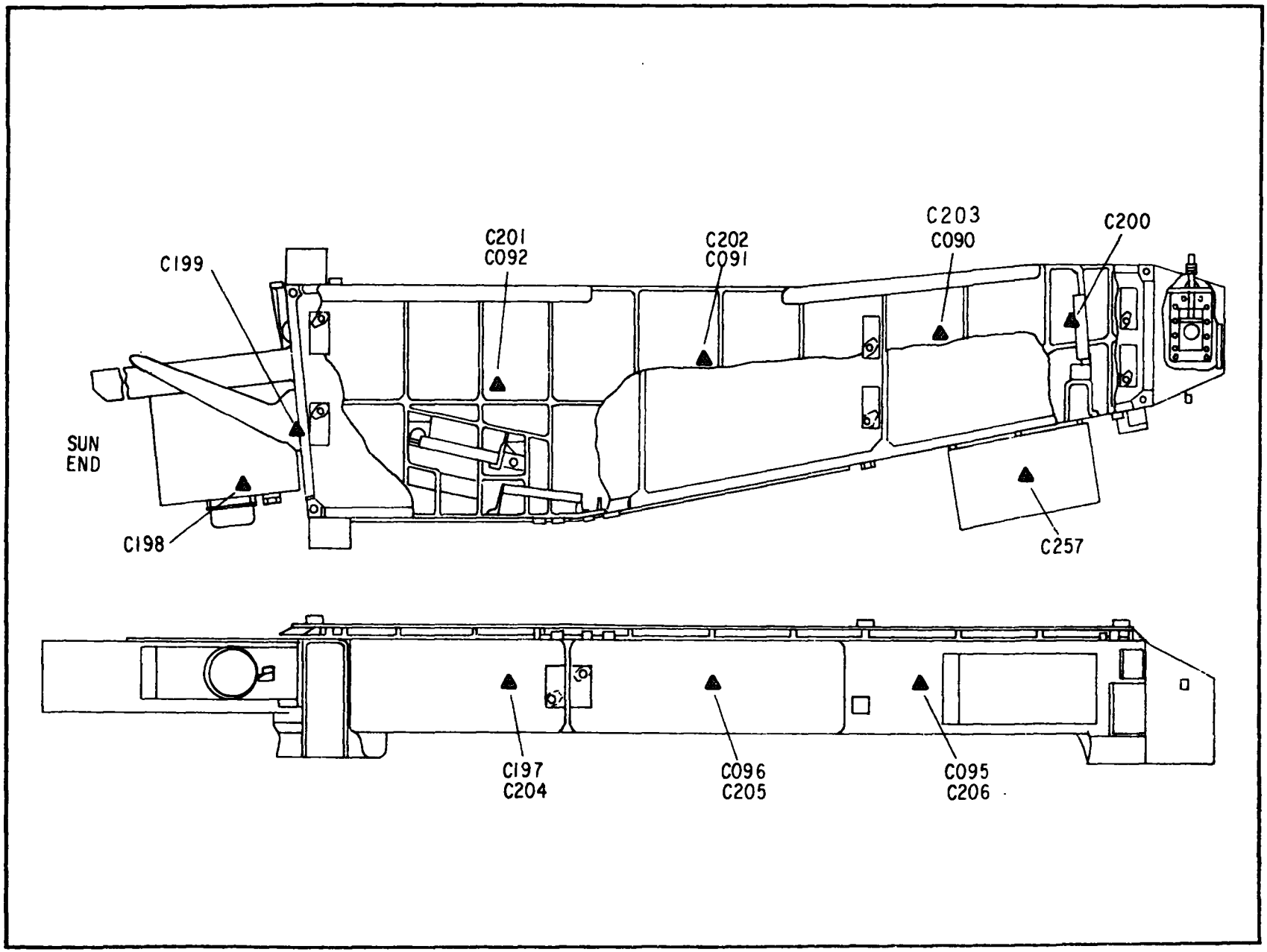

Figure 6-1. Measurement Locations for NRL-A (S082A)

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TEMPERATURE DATA 5- 7-75 AT 9 HOURS 7 MINS 15 SECS
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FRAME	TIME	ABSOLUTE TEMPERATURES (57 TO 83 DEGF) BASE TEMP REAR (C090)	BASE TEMP CENT (C091)	BASE TEMP FNT (C092)	SIDE TEMP (57 TO 83 DEGF) REAR (C095)	SIDE TEMP CENT (C096)	SIDE TEMP FNT (C097)	GRATING (63 TO 83 DEGF) (C200)	DIFFERENCE TEMPERATURES (-5 TO 5 DEGF) LID - BASE F CENT (C201)	LID - BASE CENT (C202)	LID - BASE R CENT (C203)	(-5 TO 5 DEGF) SIDE - SIDE F CENT (C204)	SIDE - SIDE CENT (C205)	SIDE - SIDE R CENT (C206)
3A-301	359:23: 8: 3: 57	67.39	68.78	69.58	67.63	68.99	69.70	67.01	.60	.36	.63	-.37	.01	.21
3A-302	360: 5:15: 4: 55	67.42	68.76	69.70	67.63	69.08	69.88	66.78	.56	.36	.57	-.42	.01	.10
3A-304	360:17:24:39:254	67.95	68.84	69.27	68.04	67.11	69.36	67.29	.65	.33	.48	-.33	.01	-.02
3A-305	361: 2:39:24:258	68.79	69.35	69.58	68.90	69.58	69.61	70.35	.57	.24	.24	-.39	-.09	-.10
3A-307	361:13:42: 3:541	69.10	68.99	69.45	68.34	69.33	69.58	67.81	.60	.32	.41	-.42	-.02	-.02
3A-308	361:13:47:17: 53	68.13	69.99	69.45	66.34	69.33	69.58	68.56	.59	.33	.41	-.39	.04	-.04
3A-309	361:15:15:11:195	69.22	69.11	69.42	68.41	69.36	69.58	68.85	.60	.29	.37	-.35	.01	-.06
3A-310	361:16:46: 2: 72	69.34	69.11	69.48	68.59	69.45	69.61	69.54	.60	.27	.36	-.42	-.04	-.09
3A-311	361:16:57: 2:153	69.53	69.21	69.51	68.62	69.45	69.61	70.00	.57	.27	.33	-.37	-.04	-.10
3A-312	362: 1:55: 1:359	69.11	69.58	69.67	69.11	69.76	69.85	70.98	.56	.19	.20	-.39	-.09	-.13
3A-314	362:14:29: 2:658	68.10	69.02	69.39	68.22	69.30	69.58	67.76	.60	.32	.41	-.37	-.04	.01
3A-315	362:14:32:52:705	68.10	69.02	69.39	68.22	69.30	69.58	67.76	.60	.32	.41	-.37	-.04	.01
3A-316	362:19:32:30:257	68.37	69.14	69.48	68.59	69.39	69.64	68.96	.57	.27	.34	-.39	-.05	-.09
3A-317	363:13:36:11:308	67.97	68.96	69.45	68.10	69.24	69.55	67.29	.63	.33	.46	-.42	.01	.01
3A-318	363:13:37:55:308	67.97	68.96	69.45	68.10	69.24	69.55	67.29	.63	.33	.46	-.42	.01	.01
3A-319	364:13: 7:47:529	67.79	68.87	69.27	68.10	69.21	69.45	67.29	.65	.33	.48	-.37	-.01	-.04
3A-320	364:13: 9: 6:857	67.79	68.87	69.27	68.10	69.21	69.45	67.29	.65	.33	.48	-.37	-.01	-.04
3A-321	364:13:14:33:660	67.79	68.87	69.27	68.10	69.21	69.45	67.29	.65	.33	.48	-.37	-.01	-.04
3A-322	364:13:16:11:708	67.79	68.87	69.27	68.10	69.21	69.45	67.29	.65	.33	.48	-.37	-.01	-.04
3A-323	365:21:43:28:109	68.13	69.11	69.73	68.37	69.45	69.85	67.76	.56	.24	.41	-.42	-.05	-.03
3A-324	365:21:50:29:358	68.13	69.11	69.70	68.34	69.51	69.82	67.76	.56	.27	.41	-.42	-.04	-.01
3A-325	366: 2:13:29:758	68.29	69.11	69.70	68.50	69.45	69.82	68.16	.56	.26	.40	-.39	-.05	-.03
3A-326	366: 2:14:58: 3	68.29	69.11	69.70	68.50	69.45	69.82	68.16	.56	.26	.40	-.39	-.05	-.03
3A-327	366:14:40:37: 58	67.97	68.84	69.11	68.13	69.18	69.27	67.52	.65	.32	.46	-.29	.01	-.02
3A-328	366:14:42: 5:308	67.97	68.84	69.11	68.13	69.18	69.27	67.52	.65	.32	.46	-.29	.01	-.02
3A-329	367: 2:12:10:808	68.16	69.08	69.45	68.37	69.36	69.61	68.39	.60	.32	.40	-.42	-.04	-.04
3A-330	367:15:29:15:558	67.88	68.96	69.33	68.13	69.27	69.48	67.47	.63	.32	.41	-.42	.01	-.02
3A-331	367:15:30:36:558	67.88	68.96	69.33	68.13	69.27	69.48	67.47	.63	.32	.41	-.42	.01	-.02
3A-332	368:13:16: 3:358	67.97	68.78	69.08	68.13	69.11	69.27	67.70	.67	.32	.44	-.34	-.02	-.02
3A-333	368:13:17:14:608	67.97	68.78	69.08	68.13	69.11	69.27	67.70	.67	.32	.44	-.34	-.02	-.02
3A-334	368:18:35:20: 6	68.37	69.08	69.27	68.59	69.36	69.33	69.77	.66	.29	.32	-.35	-.02	-.09
3A-335	369:12:32:36:158	67.88	68.99	69.39	68.10	69.21	69.51	67.47	.62	.33	.48	-.39	.01	-.02
3A-336	369:12:33:47:900	68.13	69.08	69.45	68.34	69.33	69.58	68.22	.63	.30	.40	-.42	.01	-.02
3A-337	369:15:39:43:158	68.13	69.08	69.45	68.34	69.33	69.58	68.22	.63	.30	.40	-.42	.01	-.02
3A-338	370:12: 7:16:894	67.97	68.96	69.36	68.13	69.27	69.48	67.70	.63	.33	.44	-.39	-.02	-.05
3A-340	370:19:38: 1:257	68.62	69.33	69.55	68.78	69.61	69.70	70.06	.57	.24	.29	-.38	-.02	-.10
3A-341	371:14:18:13:809	68.04	68.96	69.45	68.13	69.27	69.61	67.58	.63	.34	.44	-.37	-.02	-.02
3A-342	371:14:19:27:558	68.28	69.08	69.45	68.47	69.36	69.58	69.14	.57	.28	.36	-.38	-.02	-.09
3A-343	372:13:37: 1:858	68.10	69.02	69.58	68.16	69.39	69.70	67.58	.57	.32	.44	-.43	.01	.01
3A-344	372:13:38:18:858	68.10	69.02	69.58	68.16	69.39	69.70	67.58	.57	.32	.44	-.43	.01	.01

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TEMPERATURE DATA 5- 7-75 AT 9 HOURS 7 MINS 15 SECS
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		ABSOLUTE TEMPERATURES							DIFFERENCE TEMPERATURES					
		BASE TEMP (57 TO 83 DEGF)			SIDE TEMP (57 TO 83 DEGF)		GRATING (63 TO 83 DEGF)		LID - BASE (-5 TO 5 DEGF)			SIDE - SIDE (-5 TO 5 DEGF)		
FRAME	TIME	REAR (C090)	CENT (C091)	FNT (C092)	REAR (C095)	CENT (C096)	FNT (C197)	(C200)	F CENT (C201)	CENT (C202)	R CENT (C203)	F CENT (C204)	CENT (C205)	R CENT (C206)
3A-345	373:13: 6:19:803	68.10	68.99	69.45	68.13	69.27	69.61	67.58	.60	.32	.41	-.39	-.02	-.02
3A-347	374:12:14:31:108	68.10	69.11	69.58	68.34	69.33	69.70	67.76	.56	.27	.41	-.43	-.02	-.02
3A-348	374:12:15:40:603	68.25	69.11	69.58	68.41	69.39	69.73	68.50	.56	.24	.40	-.43	-.04	-.06
3A-349	375: 0:56:43:432	68.62	69.33	69.45	68.84	69.51	69.61	69.77	.60	.24	.32	-.39	-.06	-.09
3A-351	375:14:45:13:903	68.24	69.22	69.58	68.22	69.36	69.67	67.52	.57	.34	.41	-.45	.01	-.02
3A-352	375:19:25:30:633	68.59	69.33	69.70	68.78	69.61	69.74	70.00	.56	.23	.32	-.35	-.09	-.09
3A-353	375:22:23:48:208	68.59	69.33	69.70	68.78	69.61	69.76	70.00	.56	.23	.32	-.35	-.09	-.09
3A-354	375:22:24:59:708	68.96	69.51	69.82	69.11	69.73	69.95	70.92	.50	.21	.24	-.42	-.10	-.10
3A-355	376:13:57:27:458	68.05	69.14	69.61	68.25	69.33	69.74	67.70	.57	.32	.43	-.46	-.02	-.02
3A-357	376:16:16:41:262	68.34	69.11	69.70	68.50	69.45	69.85	69.14	.54	.29	.36	-.43	-.04	-.06
3A-358	376:20:26: 6:708	68.47	69.33	69.45	68.78	69.45	69.58	68.96	.57	.27	.36	-.38	-.06	-.06
3A-359	377: 0:49:32:758	68.71	69.24	69.58	68.84	69.51	69.73	70.00	.57	.24	.25	-.39	-.04	-.09
3A-361	377:19:29:19:216	68.62	69.39	69.70	68.87	69.58	69.82	69.43	.57	.23	.32	-.42	-.09	-.06
3A-362	378: 0: 8: 3:258	68.90	69.45	69.82	69.08	69.61	69.85	70.46	.53	.23	.24	-.46	-.09	-.09
3A-364	378:14: 6:38:508	68.13	69.27	70.07	68.41	69.51	70.25	67.76	.50	.24	.41	-.58	-.06	-.02
3A-366	378:16:20:30:691	68.47	69.36	70.13	68.62	69.61	70.32	69.14	.48	.25	.33	-.49	-.06	-.06
3A-367	378:20:35:26: 7	69.08	69.70	70.35	69.24	69.95	70.44	70.69	.41	.16	.23	-.55	-.10	-.10
3A-369	379:13:25:12:808	68.59	69.48	70.44	68.74	69.61	70.56	69.08	.41	.23	.34	-.55	-.10	-.06
3A-368	378:20:46: 2:625	69.08	69.70	70.35	69.24	69.95	70.44	70.69	.41	.16	.23	-.55	-.10	-.10
3A-371	380:12:47:22:558	68.53	69.61	70.75	68.65	69.82	70.84	68.16	.36	.18	.36	-.63	-.12	-.04
3A-372	380:12:48:42:808	68.62	69.48	70.00	69.02	69.73	70.10	69.08	.48	.23	.32	-.46	-.09	-.04
3A-373	380:13:17:51:605	68.62	69.52	69.45	68.87	69.70	70.07	69.08	.52	.21	.32	-.45	-.09	-.04
3A-374	380:13:18:59:884	68.77	69.48	69.98	68.87	69.76	70.10	69.08	.49	.23	.32	-.45	-.09	-.02
3A-375	380:14:25:24:308	68.62	69.64	70.81	68.78	69.76	70.93	68.85	.36	.19	.33	-.67	-.10	-.09
3A-376	380:14:28:26:808	68.62	69.52	69.95	68.84	69.60	70.07	69.14	.52	.21	.32	-.47	-.04	-.07
3A-377	380:22:19: 8: 66	69.61	70.29	71.30	69.64	70.35	71.43	70.69	.24	.07	.17	-.74	-.16	-.08
3A-377	380:22:19: 8: 64	69.61	70.29	71.30	69.64	70.35	71.43	70.69	.24	.07	.17	-.74	-.16	-.08
3A-380	380:23: 1:32:557	69.51	70.38	71.36	69.61	70.32	71.43	70.75	.23	.07	.15	-.70	-.16	-.09
3A-383	381:12: 7:22: 58	68.87	70.01	71.33	68.99	70.10	71.49	68.62	.23	.13	.32	-.75	-.12	.01
3A-384	381:12: 8:38: 59	68.96	70.07	71.43	69.08	70.13	71.55	68.62	.23	.13	.32	-.75	-.14	.01
3A-385	382:14:34:38:958	69.03	70.10	71.43	69.24	70.22	71.55	69.77	.23	.07	.23	-.75	-.13	-.07
3A-386	382:14:36: 2:958	69.08	70.10	71.43	69.27	70.22	71.55	69.77	.20	.11	.23	-.68	-.14	-.06
3A-387	382:19:44:18:544	69.95	70.56	71.67	70.07	70.59	71.80	71.84	.17	.01	.07	-.75	-.18	-.10
3A-388	382:19:45:26:209	69.95	70.56	71.58	70.07	70.59	71.80	71.84	.17	.02	.08	-.76	-.18	-.12
3A-389	382:19:58:13:508	69.95	70.59	71.73	70.07	70.59	71.73	71.90	.16	.03	.07	-.71	-.25	-.12
3A-390	382:20:10:38: 55	69.85	70.56	71.73	70.07	70.56	71.80	71.96	.16	.01	.07	-.71	-.21	-.12
3A-391	382:20:46:15:628	70.07	70.59	71.70	70.10	70.59	71.80	72.31	.17	.01	.07	-.67	-.21	-.13
3A-392	383:14: 5:29:377	68.87	70.07	71.33	69.08	70.10	71.49	68.62	.23	.13	.32	-.75	-.14	-.01
3A-393	383:14: 6:57:456	68.89	70.29	71.34	69.10	70.12	71.50	68.85	.24	.14	.33	-.78	-.15	-.01
3A-394	383:18:52:25:807	69.39	70.13	71.21	69.48	70.25	71.40	70.70	.24	.07	.20	-.67	-.14	-.09

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TEMPERATURE DATA 5- 7-75 AT 9 HOURS 7 MINS 15 SECS
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		ABSOLUTE TEMPERATURES							DIFFERENCE TEMPERATURES					
		BASE TEMP (57 TO 83 DEGF)			SIDE TEMP (57 TO 83 DEGF)		GRATING (63 TO 83 DEGF)		LID - BASE (-5 TO 5 DEGF)			SIDE - SIDE (-5 TO 5 DEGF)		
FRAME	TIME	REAR (C090)	CENT (C091)	FNT (C092)	REAR (C095)	CENT (C096)	FNT (C197)	(C200)	F CENT (C201)	CENT (C202)	R CENT (C203)	F CENT (C204)	CENT (C205)	R CENT (C206)
3A-395	364:18:53:31:557	69.36	70.19	71.27	69.48	70.25	71.40	70.70	.24	.08	.19	-.62	-.16	-.08
3A-396	364:11:43:40: 83	69.39	70.19	71.06	69.51	70.22	71.09	69.71	.28	.08	.19	-.69	-.13	-.08
3A-398	364:13:24:12:405	69.33	70.13	70.93	69.51	70.10	71.06	70.06	.32	.12	.16	-.59	-.13	-.10
3A-399	364:14:55:10:396	69.45	70.07	70.81	69.45	70.13	70.99	70.69	.34	.11	.17	-.53	-.14	-.10
3A-400	364:16:29:33:643	69.53	70.13	70.87	69.58	70.25	71.06	70.98	.32	.08	.15	-.59	-.14	-.13
3A-401	364:18: 3:30:970	69.58	70.25	70.84	69.61	70.22	70.99	71.33	.33	.08	.15	-.58	-.17	-.10
3A-402	364:19:41:32:408	69.61	70.13	70.87	69.61	70.25	70.96	71.61	.32	.08	.12	-.51	-.16	-.10
3A-404	364:19:53:32:172	69.48	70.13	70.87	69.58	70.31	70.99	70.98	.33	.10	.16	-.58	-.14	-.11
3A-406	364:20: 5:33:137	69.48	70.13	70.90	69.60	70.19	71.05	70.98	.35	.08	.15	-.58	-.14	-.10
3A-408	364:20:11:33:158	69.48	70.04	70.93	69.58	70.19	70.93	71.21	.32	.11	.15	-.63	-.16	-.10
3A-410	364:20:15:33:158	69.52	70.13	70.84	69.61	70.22	71.06	71.15	.33	.12	.15	-.58	-.14	-.12
3A-412	364:20:19:33:158	69.52	70.13	70.84	69.58	70.22	70.99	70.98	.34	.11	.17	-.63	-.14	-.12
3A-414	364:20:21: 3:158	69.44	70.13	70.87	69.61	70.22	71.06	71.21	.34	.15	.15	-.58	-.14	-.10
3A-416	364:20:22: 2:908	69.51	70.13	70.84	69.61	70.22	71.04	70.98	.32	.11	.15	-.59	-.14	-.12
3A-418	364:20:23: 3:158	69.51	70.13	70.84	69.64	70.19	71.06	71.15	.32	.08	.15	-.58	-.16	-.12
3A-424	364:20:26: 3:158	69.48	70.13	70.84	69.76	70.19	71.06	71.21	.33	.09	.17	-.58	-.16	-.11
3A-427	364:21:15:10:659	69.53	70.13	70.93	69.61	70.26	70.99	71.21	.32	.08	.12	-.63	-.14	-.10
3A-428	364:22:49:31:307	69.52	70.13	70.84	69.61	70.22	71.06	70.98	.32	.11	.15	-.63	-.12	-.10
3A-429	365: 0:18:19:808	69.73	70.22	70.87	69.82	70.25	70.93	71.84	.34	.08	.11	-.63	-.16	-.10
3A-430	365: 1:56:42:558	69.79	70.19	70.87	69.82	70.22	70.87	71.90	.33	.08	.08	-.51	-.17	-.13
3A-431	365: 3:22: 8:558	69.61	70.13	70.84	69.76	70.25	70.99	71.21	.30	.11	.15	-.59	-.16	-.10
3A-432	365: 5:24:47:614	69.33	70.01	70.72	69.51	70.13	70.87	70.00	.38	.12	.20	-.59	-.13	-.07
3A-435	365: 8: 2:16:762	68.96	69.82	70.56	69.08	69.95	70.72	69.08	.40	.15	.27	-.59	-.10	-.01
3A-438	365:11:33:35:908	68.59	69.58	70.41	68.78	69.73	70.56	68.39	.41	.20	.36	-.53	-.09	-.05
3A-439	365:12:44:57:322	68.59	68.58	70.44	68.74	69.76	70.56	68.85	.41	.21	.34	-.58	-.09	-.04
3A-440	385:12:46:23:650	68.59	69.52	70.44	68.74	69.76	70.56	68.85	.41	.19	.33	-.51	-.10	-.02
3A-441	385:14:21:36:806	68.74	69.61	70.38	68.90	69.73	70.56	69.60	.41	.20	.28	-.51	-.10	-.09
3A-442	365:15:49:54:894	68.96	69.70	70.44	69.11	69.82	70.56	70.29	.41	.16	.24	-.51	-.12	-.10
3A-443	365:17:21: 2:808	69.11	69.82	70.56	69.33	69.97	70.59	70.98	.40	.17	.18	-.51	-.10	-.10
3A-444	365:19:37: 0:517	69.33	69.85	70.50	69.45	70.01	70.56	70.75	.41	.14	.19	-.52	-.12	-.10
3A-445	365:20:28:48:658	69.27	69.85	70.41	69.45	70.07	70.56	70.64	.41	.13	.20	-.51	-.10	-.10
3A-446	365:22: 1:36:908	69.33	69.82	70.41	69.42	69.98	70.56	70.92	.44	.15	.20	-.50	-.12	-.10
3A-447	365:22: 1:36:950	69.33	69.82	70.41	69.42	69.98	70.56	70.92	.44	.15	.20	-.50	-.12	-.10
3A-448	365:23:36:54:158	69.33	69.85	70.44	69.45	69.97	70.50	70.98	.41	.15	.19	-.46	-.10	-.10
3A-449	366: 1: 7:33:409	69.45	69.85	70.44	69.58	70.07	70.56	71.21	.41	.15	.17	-.49	-.12	-.11
3A-450	366:12: 2:47:774	68.47	69.45	70.10	68.62	69.61	70.35	68.16	.46	.23	.37	-.51	-.09	-.02
3A-452	366:23:15:53:609	69.04	69.61	70.04	69.24	69.82	70.10	70.52	.50	.19	.23	-.43	-.10	-.09
3A-459	366:23:20:31:962	69.08	69.61	69.98	69.21	69.82	70.10	70.64	.49	.19	.23	-.43	-.09	-.09
3A-462	366:23:21:30:204	69.08	69.76	70.01	69.21	69.82	70.10	70.52	.50	.19	.23	-.47	-.12	-.10
3A-466	366:23:27:26:958	69.08	69.61	70.01	69.27	69.82	70.10	70.58	.47	.19	.23	-.43	-.10	-.10

S082A-EDB
TEMPERATURE DATA 5- 7-75 AT 9 HOURS 7 MINS 15 SECS
PAGE 8

		ABSOLUTE TEMPERATURES							DIFFERENCE TEMPERATURES					
		BASE TEMP (57 TO 83 DEGF)			SIDE TEMP (57 TO 83 DEGF)		GRATING (63 TO 83 DEGF)		LID - BASE (-5 TO 5 DEGF)			SIDE - SIDE (-5 TO 5 DEGF)		
FRAME	TIME	REAR (C090)	CENT (C091)	FNT (C092)	REAR (C095)	CENT (C096)	FNT (C197)	(C200)	F CENT (C201)	CENT (C202)	R CENT (C203)	F CENT (C204)	CENT (C205)	R CENT (C206)
3A-468	366:23:35:27:208	69.03	69.61	70.07	69.27	69.82	70.19	70.46	.49	.19	.21	-.46	-.10	-.10
3A-469	366:23:40:48:480	69.11	69.61	70.07	69.27	69.82	70.10	70.81	.50	.19	.23	-.46	-.12	-.09
3A-470	366:23:45:58:221	69.08	69.61	70.07	69.33	69.85	70.19	70.69	.50	.21	.21	-.47	-.10	-.10
3A-471	367: 0:34:23:958	69.08	69.61	70.07	69.27	69.85	70.19	70.75	.48	.19	.21	-.43	-.10	-.10
3A-472	367: 0:49:22: 45	69.11	69.70	70.01	69.33	69.85	70.10	70.81	.49	.19	.23	-.47	-.10	-.10
3A-473	367:11:51:44:508	68.34	69.36	69.95	68.47	69.48	70.07	68.04	.52	.24	.40	-.47	-.09	-.01
3A-475	367:11:59:43: 3	68.25	69.33	69.95	68.53	69.58	70.10	68.04	.50	.24	.40	-.49	-.06	.01
3A-476	367:12: 0:12:508	68.34	69.33	69.85	68.47	69.51	70.10	67.99	.50	.24	.39	-.45	-.03	-.03
3A-477	367:22:41: 4:507	68.47	69.21	69.48	68.62	69.45	69.61	69.14	.57	.24	.35	-.39	-.05	-.06
3A-479	367:22:44:35:257	68.52	69.24	69.58	68.62	69.45	69.61	69.31	.60	.24	.34	-.39	-.04	-.09
3A-480	367:22:46:12:507	68.47	69.21	69.51	68.62	69.58	69.61	69.37	.57	.27	.33	-.35	.01	-.09
3A-481	368:12:19:36:358	68.13	69.11	69.73	68.34	69.39	69.85	67.70	.56	.29	.41	-.43	-.04	.03
3A-483	369:11:39: 4:653	68.22	69.21	69.73	68.41	69.45	69.85	67.99	.56	.27	.40	-.42	-.04	-.02
3A-485	370:12:23: 6:965	68.16	69.08	69.61	68.28	69.39	69.61	67.70	.56	.29	.41	-.42	-.04	-.01
3A-487	371:13:23:32:220	67.97	69.02	69.48	68.13	69.33	69.61	67.70	.57	.32	.41	-.39	-.04	-.02
3A-488	371:13:23:32:236	67.97	69.02	69.48	68.13	69.33	69.61	67.70	.57	.32	.41	-.39	-.04	-.02
3A-489	371:22:35: 5: 7	68.22	69.02	69.21	68.37	69.33	69.36	68.79	.65	.32	.40	-.28	-.05	-.06
3A-490	371:23:18:34:669	68.34	69.08	69.11	68.50	69.33	69.39	69.20	.62	.32	.37	-.29	-.02	-.09
3A-491	372:22:12: 2:943	67.91	68.84	68.99	68.13	69.11	69.11	67.70	.71	.33	.45	-.32	.01	-.05
3A-492	372:23:55:38:353	68.04	68.84	69.08	68.22	69.15	69.21	68.50	.69	.34	.41	-.31	.03	-.06
3A-493	373:11:54:39:736	67.97	68.96	69.45	68.13	69.27	69.61	67.52	.60	.32	.46	-.38	-.05	-.02
3A-495	374:22: 8: 3: 7	67.85	68.84	69.11	68.10	69.11	69.33	67.29	.66	.35	.48	-.34	-.01	-.02
3A-497	375: 0:26:12:574	68.04	68.96	69.24	68.22	69.24	69.36	68.16	.65	.33	.41	-.42	-.02	-.06
3A-499	375:20:26:11:751	67.85	68.84	69.08	68.10	69.14	69.27	67.47	.69	.36	.46	-.34	.03	.01
3A-500	376:19: 8:52: 57	67.91	68.84	69.21	68.00	69.11	69.36	67.29	.67	.36	.48	-.38	.01	.01

ASSIGNED TASK COMPLETED

Ball