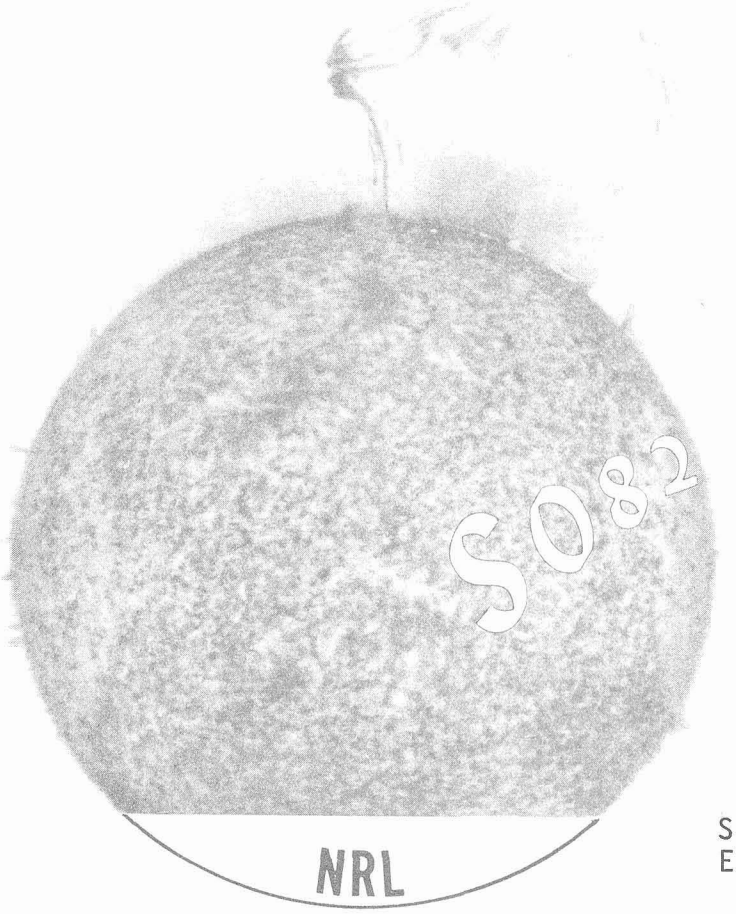
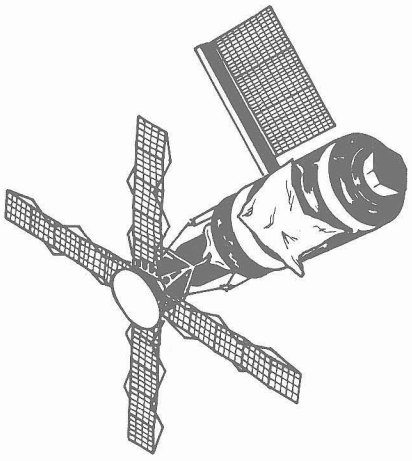
"A" Data Room

NRL / ATM
MISSION ENGINEERING DATA





S082A SPECTROHELIOGRAPH
EXPOSURES 1A-201 THROUGH 1A-401

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. A2 SL 1/2

Sequence Log

ATM No.	Film Roll Strip Cut	Dev Run
1A201	14-9	A
1A202	14-8	1
1A203	14-7	
1A204	14-6	
1A205	14-5	
1A206	15-102	
1A207	15-101	
1A208	15-100	
1A209	15-99	
1A210	15-98	
1A211	15-97	
1A212	15-96	
1A213	15-95	
1A214	15-94	
1A215	15-93	
1A216	15-91	
1A217	15-90	
1A218	15-89	
1A219	15-88	
1A220	15-87	
1A221	15-86	
1A222	15-85	
1A223	15-84	
1A224	15-83	
1A225	15-82	
1A226	15-80	
1A227	15-79	
1A228	15-78	
1A229	15-77	
1A230	15-76	
1A231	15-75	
1A232	15-74	
1A233	15-73	
1A234	15-72	
1A235	15-71	
1A236	15-69	
1A237	15-68	
1A238	15-67	
1A239	15-66	
1A240	15-65	
1A241	15-64	1
1A242	15-63	2
1A243	15-62	
1A244	15-61	
1A245	15-60	
1A246	15-58	
1A247	15-57	
1A248	15-56	
1A249	15-55	
1A250	15-54	
1A251	15-53	
1A252	15-52	

ATM No.	Film Roll Strip Cut	Dev Run
1A253	15-51	2
1A254	15-50	
1A255	15-49	
1A256	15-47	
1A257	15-46	
1A258	15-45	
1A259	15-44	
1A260	15-43	
1A261	15-42	
1A262	15-41	
1A263	15-40	
1A264	15-39	
1A265	15-38	
1A266	15-36	
1A267	15-35	
1A268	15-34	
1A269	15-33	
1A270	15-32	
1A271	15-31	
1A272	15-30	
1A273	15-29	
1A274	15-28	
1A275	15-27	
1A276	15-25	
1A277	15-24	
1A278	15-23	
1A279	15-22	
1A280	15-21	
1A281	15-20	2
1A282	15-19	3
1A283	15-18	
1A284	15-17	
1A285	15-16	
1A286	15-14	
1A287	15-13	
1A288	15-12	
1A289	15-11	
1A290	15-10	
1A291	15-9	
1A292	15-8	
1A293	15-7	
1A294	15-6	
1A295	15-5	
1A296	14-17	
1A297	14-18	
1A298	14-19	
1A299	14-20	
1A300	14-21	3
1A301	14-23	5
1A302	14-24	
1A303	14-25	
1A304	14-27	

ATM No.	Film Roll Strip Cut	Dev Run
1A305	14-28	5
1A306	14-29	
1A307	14-30	
1A308	14-31	
1A309	14-32	
1A310	14-33	
1A311	14-34	
1A312	14-35	
1A313	14-37	
1A314	14-38	
1A315	14-39	
1A316	14-40	
1A317	14-41	
1A318	14-42	
1A319	14-43	
1A320	14-44	
1A321	14-45	
1A322	14-46	
1A323	14-48	
1A324	14-49	
1A325	14-50	
1A326	14-51	
1A327	14-52	
1A328	14-53	
1A329	14-54	
1A330	14-55	
1A331	14-56	
1A332	14-57	
1A333	14-59	
1A334	14-60	
1A335	14-61	
1A336	14-62	
1A337	14-63	
1A338	14-64	
1A339	14-65	
1A340	14-66	
1A341	14-67	5
1A342	14-68	4
1A343	14-70	
1A344	14-71	
1A345	14-72	
1A346	14-73	
1A347	14-74	
1A348	14-75	
1A349	14-76	
1A350	14-77	
1A351	14-78	
1A352	14-79	
1A353	14-81	
1A354	14-82	
1A355	14-83	
1A356	14-84	

ATM No.	Film Roll Strip Cut	Dev Run
1A357	14-85	4
1A358	14-86	
1A359	14-87	
1A360	14-88	
1A361	14-89	
1A362	14-90	
1A363	12-5	
1A364	12-6	
1A365	12-7	
1A366	12-8	
1A367	12-9	
1A368	12-10	
1A369	12-11	
1A370	12-12	
1A371	12-13	
1A372	12-14	
1A373	12-16	
1A374	12-17	
1A375	12-18	
1A376	12-19	
1A377	12-20	
1A378	12-21	
1A379	12-22	
1A380	12-23	
1A381	12-24	4
1A382	12-25	3
1A383	12-27	
1A384	12-28	
1A385	12-29	
1A386	12-30	
1A387	12-31	
1A388	12-32	
1A389	12-33	
1A390	12-34	
1A391	12-35	
1A392	12-36	
1A393	12-38	
1A394	12-39	
1A395	12-45	
1A396	12-46	
1A397	14-15	
1A398	14-14	
1A399	14-13	
1A400	14-12	
1A401	14-11	
1A402	14-22	3
1A403	14-10	A

Film Data

Roll No.	Film Type
12	104-06-05
14	104-06-05
15	104-06-05

205	June 8	375	June 17
210	9	385	18
228	11	388	18
229	11	395	19
233	11		
240	12		
247	12		
255	12		
256	12		
257	12		
258	12		
259	12		
280	14		
289	14		
302	15		
312			
319			
321			
328			
330			
337			
343			
345			
346			
347			
350	15		
351			
352			
353 xx			
354			
358			
360	15		

FILM NR	DATE	DOY	SHUTTER OPEN	CLOSE	EXP TIME	WAVELENGT
1A203	JUN 9,73	160	1H 20M 20.00S	20M 28.50S	8.50S	SHORT
1A204	JUN 9,73	160	1H 27M 25.25S	27M 34.50S	9.25S	SHORT
1A210	JUN 9,73	160	21H 8M 20.25S	8M 30.00S	9.75S	SHORT
1A218	JUN 10,73	161	17H 21M 13.50S	21M 23.25S	9.75S	SHORT
1A225	JUN 10,73	161	20H 50M 19.25S	50M 28.75S	9.50S	SHORT
1A228	JUN 11,73	162	1H 10M 3.00S	10M 12.25S	9.25S	SHORT
1A229	JUN 11,73	162	1H 19M 28.00S	19M 38.00S	10.00S	SHORT
1A233	JUN 11,73	162	18H 10M 15.25S	10M 24.75S	9.50S	SHORT
1A240	JUN 12,73	163	0H 26M 58.50S	27M 8.50S	10.00S	SHORT
1A247	JUN 12,73	163	17H 32M 5.50S	32M 15.75S	10.25S	SHORT
1A255	JUN 12,73	163	21H 25M 6.75S	25M 16.50S	9.75S	SHORT
1A256	JUN 12,73	163	21H 25M 21.50S	25M 31.50S	10.00S	SHORT
1A257	JUN 12,73	163	21H 25M 36.50S	25M 46.50S	10.00S	SHORT
1A258	JUN 12,73	163	21H 25M 51.50S	26M 1.50S	10.00S	SHORT
1A259	JUN 12,73	163	22H 9M 53.25S	10M 3.00S	9.75S	SHORT
1A275	JUN 13,73	164	23H 0M 12.00S	0M 21.25S	9.75S	SHORT
1A267	JUN 13,73	164	18H 19M 53.00S	44M 45.75S	10.00S	SHORT
1A280	JUN 14,73	165	20H 44M 36.00S	52M 31.75S	10.00S	SHORT
1A289	JUN 14,73	165	19H 9M 23.00S	9M 32.75S	9.75S	SHORT
1A293						
1A302	JUN 15,73	166	5H 6M 46.50S	6M 56.50S	10.00S	SHORT
1A313	JUN 15,73	166	14H 11M 42.50S	11M 52.50S	10.00S	SHORT
1A319	JUN 15,73	166	14H 14M 31.00S	14M 41.00S	10.00S	SHORT
1A321	JUN 15,73	166	14H 15M 24.75S	15M 34.50S	9.75S	SHORT
1A328	JUN 15,73	166	14H 22M 39.00S	22M 49.00S	10.00S	SHORT
1A330	JUN 15,73	166	14H 23M 32.75S	23M 42.50S	9.75S	SHORT
1A337	JUN 15,73	166	14H 33M 54.00S	34M 4.00S	10.00S	SHORT
1A343	JUN 15,73	166	14H 36M 42.75S	36M 52.50S	9.75S	SHORT
1A345	JUN 15,73	166	14H 37M 36.25S	37M 46.25S	10.00S	SHORT
1A347	JUN 15,73	166	14H 38M 30.00S	38M 42.00S	12.00S	SHORT
1A348	JUN 15,73	166	15H 22M 0.50S	22M 10.25S	9.75S	SHORT
1A349	JUN 15,73	166	15H 32M 10.50S	32M 20.25S	9.75S	SHORT
1A350	JUN 15,73	166	15H 42M 50.25S	42M 59.25S	9.00S	SHORT
1A351	JUN 15,73	166	15H 53M 9.25S	53M 18.50S	9.25S	SHORT
1A352	JUN 15,73	166	16H 5M 48.50S	5M 58.50S	10.00S	SHORT
1A353	JUN 15,73	166	16H 55M 1.00S	55M 3.50S	2.50S	SHORT
1A354	JUN 15,73	166	16H 55M 5.50S	55M 15.50S	10.00S	SHORT
1A358	JUN 15,73	166	20H 15M 57.25S	16M 7.00S	9.75S	SHORT
1A359	JUN 15,73	166	20H 27M 32.00S	27M 34.00S	2.00S	SHORT
1A360	JUN 15,73	166	20H 33M 22.00S	33M 31.75S	9.75S	SHORT
1A375	JUN 17,73	168	17H 5M 2.00S	5M 11.75S	9.75S	SHORT
1A385	JUN 18,73	169	15H 12M 50.00S	13M 0.00S	10.00S	SHORT
1A387	JUN 18,73	169	16H 22M 31.25S	22M 41.00S	9.75S	SHORT
1A388	JUN 18,73	169	16H 31M 31.50S	31M 41.75S	10.25S	SHORT
1A396	JUN 19,73	170	[illegible]	3[illegible]M 16.75S	10.00S	SHORT

LM NR	DATE	DOY	SHUTTER OPEN	CLOSE	EXP TIME	WAVELENGTH
203	JUN 9.73	160	1H 20M 20.00S	20M 28.50S	8.50S	SHORT
204	JUN 9.73	160	1H 27M 25.25S	27M 34.50S	9.25S	SHORT
210	JUN 9.73	160	21H 8M 20.25S	8M 30.00S	9.75S	SHORT
218	JUN 10.73	161	17H 21M 13.50S	21M 23.25S	9.75S	SHORT
25	JUN 10.73	161	20H 50M 19.25S	50M 28.75S	9.50S	SHORT
228	JUN 11.73	162	1H 10M 3.00S	10M 12.25S	9.25S	SHORT
229	JUN 11.73	162	1H 19M 28.00S	19M 38.00S	10.00S	SHORT
233	JUN 11.73	162	18H 10M 15.25S	10M 24.75S	9.50S	SHORT
240	JUN 12.73	163	0H 26M 58.50S	27M 8.50S	10.00S	SHORT
247	JUN 12.73	163	17H 32M 5.50S	32M 15.75S	10.25S	SHORT
255	JUN 12.73	163	21H 25M 6.75S	25M 16.50S	9.75S	SHORT
256	JUN 12.73	163	21H 25M 21.50S	25M 31.50S	10.00S	SHORT
257	JUN 12.73	163	21H 25M 36.50S	25M 46.50S	10.00S	SHORT
258	JUN 12.73	163	21H 25M 51.50S	26M 1.50S	10.00S	SHORT
259	JUN 12.73	163	22H 9M 53.25S	10M 3.00S	9.75S	SHORT
275	JUN 13.73	164	23H 0M 12.00S	0M 21.25S	9.75S	SHORT
267	JUN 13.73	164	18H 19M 53.00S	44M 45.75S	10.00S	SHORT
280	JUN 14.73	165	20H 44M 36.00S	31.75S	10.00S	SHORT
289	JUN 14.73	165	9M 23.00S	9M 32.75S	9.75S	SHORT
293						
302	JUN 15.73	166	5H 6M 46.50S	6M 56.50S	10.00S	SHORT
313	JUN 15.73	166	14H 11M 42.50S	11M 52.50S	10.00S	SHORT
A319	JUN 15.73	166	14H 14M 31.00S	14M 41.00S	10.00S	SHORT
A321	JUN 15.73	166	14H 15M 24.75S	15M 34.50S	9.75S	SHORT
A328	JUN 15.73	166	14H 22M 39.00S	22M 49.00S	10.00S	SHORT
A330	JUN 15.73	166	14H 23M 32.75S	23M 42.50S	9.75S	SHORT
A337	JUN 15.73	166	14H 33M 54.00S	34M 4.00S	10.00S	SHORT
A343	JUN 15.73	166	14H 36M 42.75S	36M 52.50S	10.00S	SHORT
A345	JUN 15.73	166	14H 37M 36.25S	37M 46.25S	10.00S	SHORT
A347	JUN 15.73	166	14H 38M 30.00S	38M 42.00S	12.00S	SHORT
A348	JUN 15.73	166	15H 22M 0.50S	22M 10.25S	9.75S	SHORT
A349	JUN 15.73	166	15H 32M 10.50S	32M 20.25S	9.75S	SHORT
A350	JUN 15.73	166	15H 42M 50.25S	42M 59.25S	9.00S	SHORT
A351	JUN 15.73	166	15H 53M 9.25S	53M 18.50S	9.25S	SHORT
A352	JUN 15.73	166	16H 5M 48.50S	5M 58.50S	10.00S	SHORT
A353	JUN 15.73	166	16H 55M 1.00S	55M 3.50S	2.50S	SHORT
A354	JUN 15.73	166	16H 55M 5.50S	55M 15.50S	10.00S	SHORT
A358	JUN 15.73	166	20H 15M 57.25S	16M 7.00S	9.75S	SHORT
A359	JUN 15.73	166	20H 27M 32.00S	27M 34.00S	2.00S	SHORT
A360	JUN 15.73	166	20H 33M 22.00S	33M 31.75S	9.75S	SHORT
A375	JUN 17.73	168	17H 5M 2.00S	5M 11.75S	9.75S	SHORT
A385	JUN 18.73	169	15H 12M 50.00S	13M 0.00S	10.00S	SHORT
A387	JUN 18.73	169	16H 22M 31.25S	22M 41.00S	9.75S	SHORT
A388	JUN 18.73	169	16H 31M 31.50S	31M 41.75S	10.25S	SHORT
A396	JUN 19.73	170	6H 30M 18.75S	30M 16.75S	10.00S	SHORT

BALL BROTHERS RESEARCH CORPORATION

BOULDER, COLORADO

NRL/ATM
MISSION ENGINEERING DATA
FOR
S082A SPECTROHELIOGRAPH
EXPOSURES 1A-201 THROUGH 1A-401

620-240 — 22 May 1974
Rev A — 16 May 1975

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

PREPARED

Roger I. Weary
Project Engineer
Configuration Management

APPROVED

M. W. Frank
NRL/ATM Program Manager

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-007 (exposure numbers 1A-201 through 1A-402). 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:

Ferguson, D. W.
Frobom, L.
Grunz, R. H.
Guy, J. H.
Hassig, R. E.
McDaniel, D. L.
Schlagel, L. L.
Schneible, D. E.
Sidle, W. R.
Slingsby, P. A.

VanHoosier, M. E., NRL
Hunter, W. R., NRL

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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. Preflight 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-007
Flight:	L/N A-2
No. of Film Holders:	Upper 101; Lower 101; Carrier 1
Skylab Mission:	SL-1 & 2
Launch Date:	14 May 1973
Installed on Instrument:	7 June 1973
Removed from Instrument:	19 June 1973
Splashdown:	22 June 1973

Significant Remarks:

Rev A This camera was used to replace CM10A-003 after A003 jammed during SL-1 & 2 Mission. It was launched on SL-1 in MDA Film Vault; exposed on SL-2 and returned on SL-2.

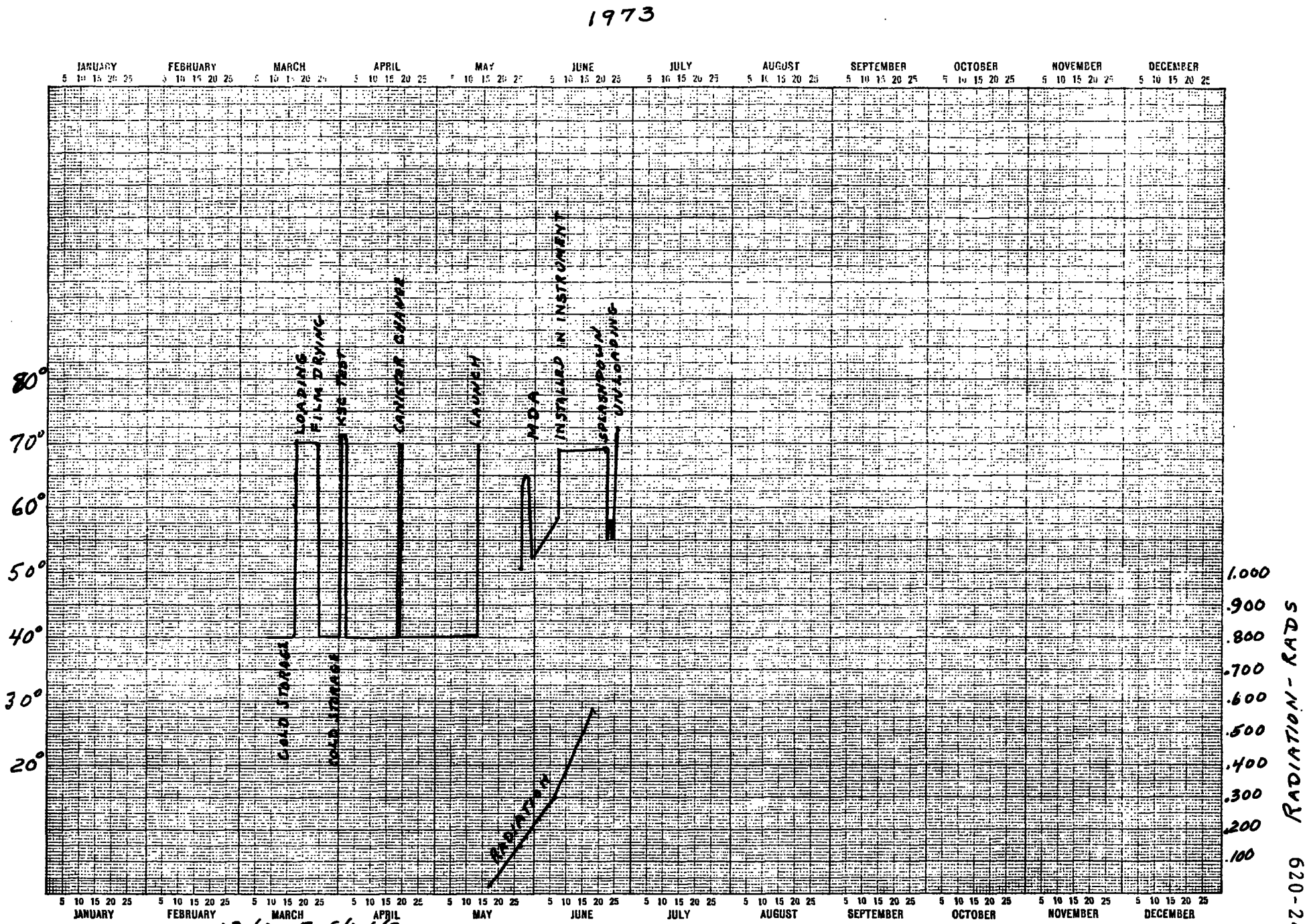
2.2 ENVIRONMENTAL DATA

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



CAMERA S/N A2/A007 S/L-1/2
FILM ROLL # 12-104
14-104
15-104

Figure 2-1. Environmental Parameters

Table 2-1
FILM TRACEABILITY CHART

DATE 3-20-74 CAMERA P/N 36360-501 S/N A2/A007

ROLL NO.	CONTROL SAMPLE NO	EXPOSURE NO.	FILM HOLDER NO.
15-1	1		
15-2	2		
15-3	3		
15-4	4		
15-5		1A295	1
15-6		1A294	2
15-7		1A293	3
15-8		1A292	4
15-9		1A291	5
15-10		1A290	6
15-11		1A289	7
15-12		1A288	8
15-13		1A287	9
15-14		1A286	10
15-15	5		
15-16		1A285	11
15-17		1A284	12
15-18		1A283	13
15-19		1A282	14
15-20		1A281	15
15-21		1A280	16
15-22		1A279	17
15-23		1A278	18
15-24		1A277	19
15-25		1A276	20
15-26	6		
15-27		1A275	21
15-28		1A274	22
15-29		1A269	23
15-30		1A273	24
15-31		1A272	25
15-32		1A271	26
15-33		1A270	27
15-34		1A268	28
15-35		1A267	29
15-36		1A266	30
15-37	7		
15-38		1A265	31
15-39		1A264	32
15-40		1A263	33
15-41		1A262	34
15-42		1A261	35
15-43		1A260	36
15-44		1A259	37
15-45		1A258	38
15-46		1A257	39
15-47		1A256	40
15-48	8		
15-49		1A255	41
15-50		1A254	42
15-51		1A253	43
15-52		1A252	44
15-53		1A251	45
15-54		1A250	46
15-55		1A249	47
15-56		1A248	48
15-57		1A247	49
15-58		1A246	50
15-59	9		
15-60		1A245	51
15-61		1A244	52
15-62		1A243	53
15-63		1A242	54
15-64		1A241	55
15-65		1A240	56
15-66		1A239	57
15-67		1A238	58
15-68		1A237	59
15-69		1A236	60
15-70	10		
15-71		1A235	61
15-72		1A234	62
15-73		1A233	63
15-74		1A232	64
15-75		1A231	65
15-76		1A230	66
15-77		1A229	67
15-78		1A228	68
15-79		1A227	69
15-80		1A226	70
15-81	11		
15-82		1A225	71
15-83		1A224	72
15-84		1A223	73
15-85		1A222	74
15-86		1A221	75
15-87		1A220	76
15-88		1A219	77
15-89		1A218	78
15-90		1A217	79
15-91		1A216	80
15-92	12		
15-93		1A215	81
15-94		1A214	82
15-95		1A213	83
15-96		1A212	84
15-97		1A211	85
15-98		1A210	86
15-99		1A209	87
15-100		1A208	88
15-101		1A207	89
15-102		1A206	90
15-103	13		
15-104	14		
14-1	15		
14-2	16		
14-3	17		
14-4	18		
14-5		1A205	91
14-6		1A204	92
14-7		1A203	93
14-8		1A202	94
14-9		1A201	95
14-10		1A403	96
14-11		1A401	97
14-12		1A400	98
14-13		1A399	99
14-14		1A398	100
14-15		1A397	101
14-16	19		
14-17		1A296	102
14-18		1A297	103
14-19		1A298	104
14-20		1A299	105
14-21		1A300	106
14-22		1A402	107
14-23		1A301	108
14-24		1A302	109
14-25		1A303	110
14-26	20		
14-27		1A304	111
14-28		1A305	112
14-29		1A306	113
14-30		1A307	114
14-31		1A308	115
14-32		1A309	116
14-33		1A310	117
14-34		1A311	118
14-35		1A312	119
14-36	21		
14-37		1A313	120
14-38		1A314	121
14-39		1A315	122
14-40		1A316	123
14-41		1A317	124
14-42		1A318	125
14-43		1A319	126
14-44		1A320	127
14-45		1A321	128
14-46		1A322	129
14-47	22		
14-48		1A323	130
14-49		1A324	131
14-50		1A325	132
14-51		1A326	133
14-52		1A327	134
14-53		1A328	135
14-54		1A329	136
14-55		1A330	137
14-56		1A331	138
14-57		1A332	139
14-58	23		
14-59		1A333	140
14-60		1A334	141
14-61		1A335	142
14-62		1A336	143
14-63		1A337	144
14-64		1A338	145
14-65		1A339	146
14-66		1A340	147
14-67		1A341	148
14-68		1A342	149
14-69	24		
14-70		1A343	150
14-71		1A344	151
14-72		1A345	152
14-73		1A346	153
14-74		1A347	154
14-75		1A348	155
14-76		1A349	156
14-77		1A350	157
14-78		1A351	158
14-79		1A352	159
14-80	25		
14-81		1A353	160
14-82		1A354	161
14-83		1A355	162
14-84		1A356	163
14-85		1A357	164
14-86		1A358	165
14-87		1A359	166
14-88		1A360	167
14-89		1A361	168
14-90		1A362	169
14-91	26		
14-92	27		
12-1	28		
12-2	29		
12-3	30		
12-4	31		
12-5		1A363	170
12-6		1A364	171
12-7		1A365	172
12-8		1A366	173
12-9		1A367	174
12-10		1A368	175
12-11		1A369	176
12-12		1A370	177
12-13		1A371	178
12-14		1A372	179
12-15	32		
12-16		1A373	180
12-17		1A374	181
12-18		1A375	182
12-19		1A376	183
12-20		1A377	184
12-21		1A378	185
12-22		1A379	186
12-23		1A380	187
12-24		1A381	188
12-25		1A382	189
12-26	33		
12-27		1A383	190
12-28		1A384	191
12-29		1A385	192
12-30		1A386	193
12-31		1A387	194
12-32		1A388	195
12-33		1A389	196
12-34		1A390	197
12-35		1A391	198
12-36		1A392	199
12-37	34		
12-38		1A393	200
12-39		1A394	201
12-45		1A395	202
12-46		1A396	203
12-42	35		
12-43	36		
12-44	37		

NOTES

The camera reached lockout at film holder 99, exposure 1A-399, therefore, exposures 1A-400, 1A-401 and 1A-403 were not exposed to sunlight. Film strip 14-22 in holder 107 was labeled out of sequence, exposure No. 1A-402.

FILM DATA	
ROLL NO.	FILM TYPE
12	104-06-05
14	104-06-05
15	104-06-05

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

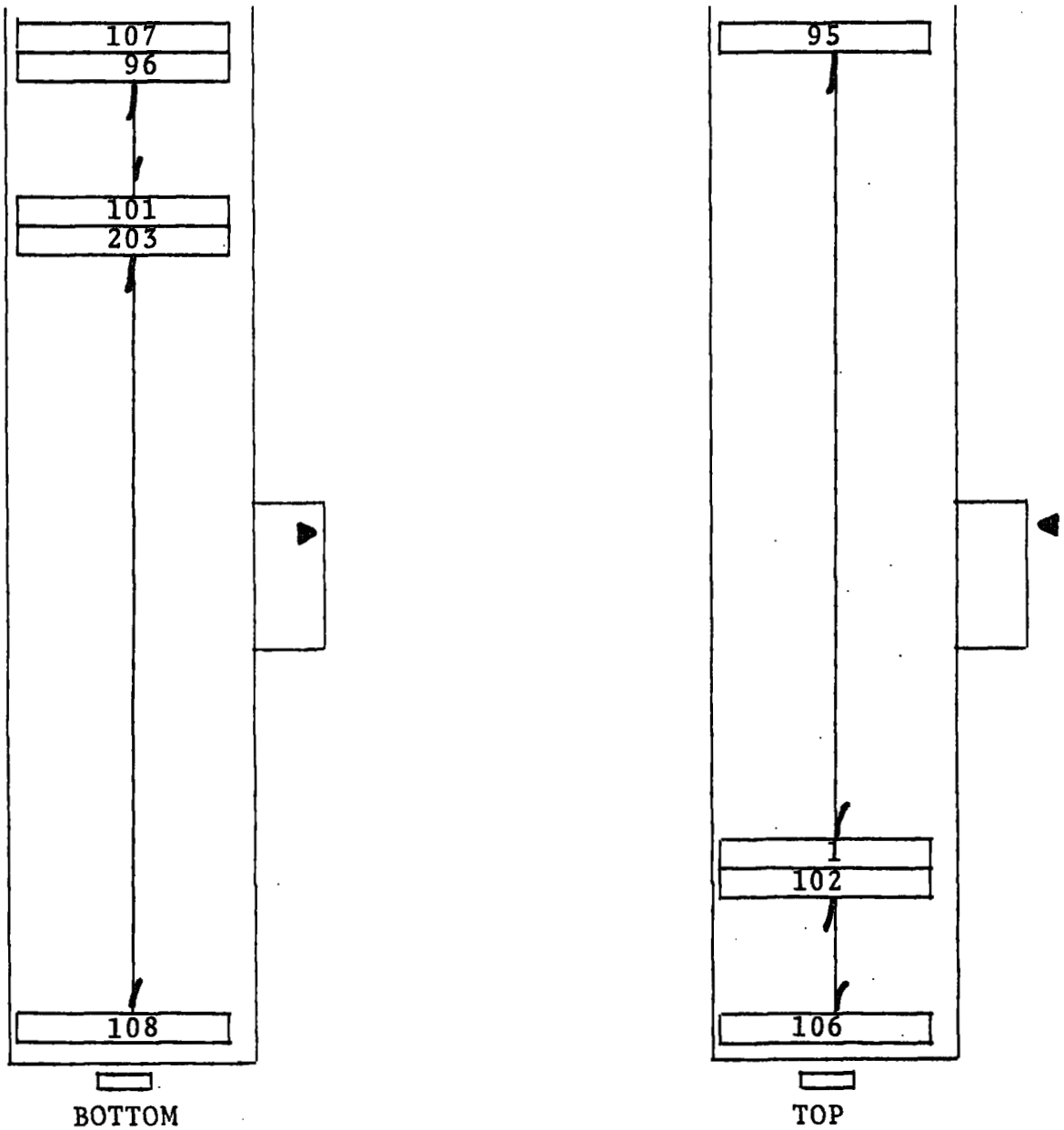
The cameras were flown to NRL after splashdown for unloading. The attached chart (see Table 2-2) shows the order in which the film holders were placed into the cassettes during the unloading operation. The film holder numbers can be traced to the loading data chart, Table 2-1, to cross reference exposure, 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 A2/A007

Date 26 Jun 1973

Table 2-3
Developing

Camera Serial No. CM10A-007
Flight Load No. A-2

Run No.	Exposure Numbers	Dev. Control Sample	Date
	Upper Stack:		
A	1A-403		7/5/73
	1A-201		7/5/73
1	1A-202 through 1A-241	A007-1-1, 2, 3, 4	7/5/73
2	1A-242 through 1A-281	A007-2-1, 2, 3, 4	7/5/73
3	1A-282 through 1A-300	A007-3-1, 2, 3, 4	7/5/73
	Lower Stack:		
3	1A-402 through 1A-382		7/5/73
4	1A-381 through 1A-342	A007-4-1, 2, 3, 4	7/5/73
5	1A-341 through 1A-301	A007-5-1, 2, 3, 4, 5, 6	7/5/73

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 2-18.
- Preflight Transmission Data (see Data Sheet, page 2-19).
- 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)

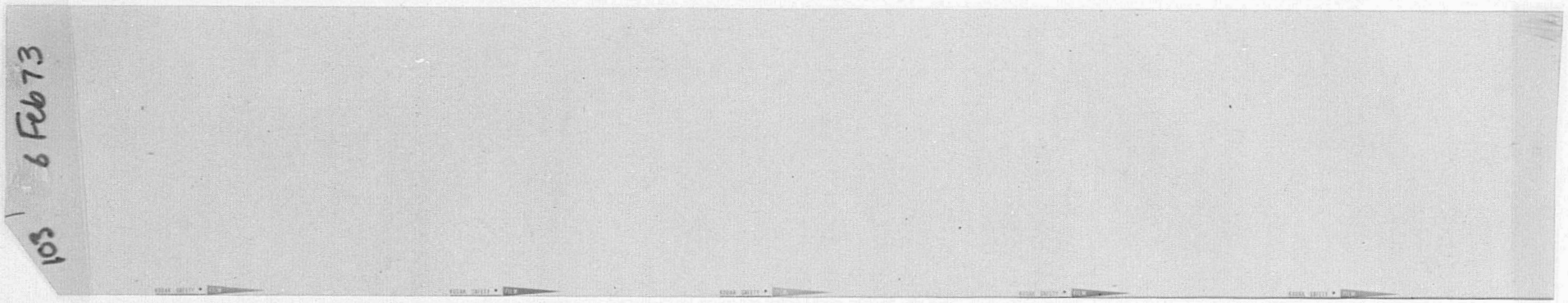
Column 2 Although labelled "ANG. INC." these numbers identify the filters and the position on that filter at which the measurement was made. A key to these numbers is given at the top of each first page.

Column 3 Measured Transmittance.

Column 4 Probable Error of the Measurement.

Column 5 Probable error converted to % error.

Figure 2-2 Photograph of Filter



PINHOLE FOGGING MAP DATE: 6 Feb 73

ATM-2- 103

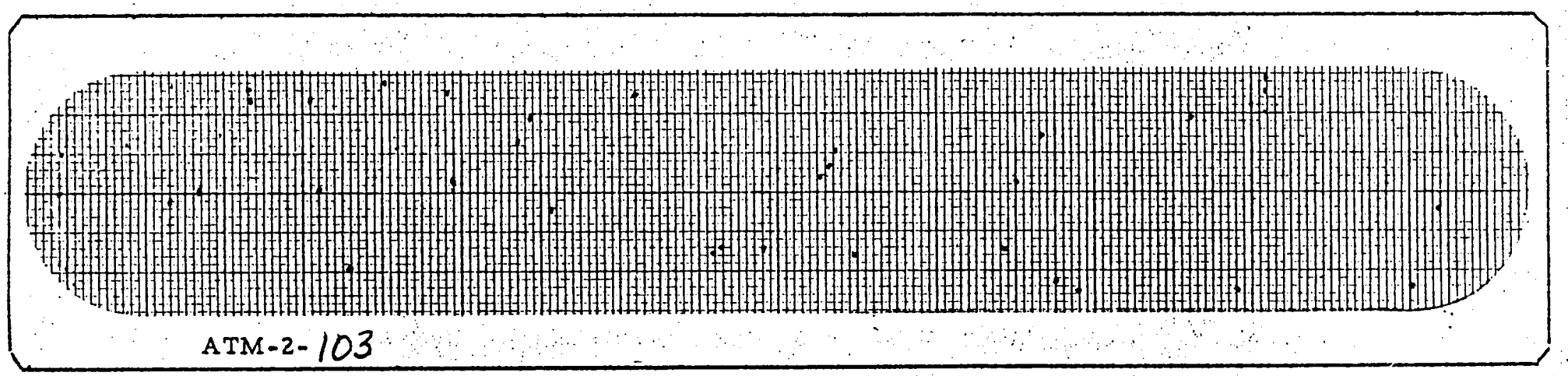
Figure 2-3 Pinhole Fogging Map

Figure 2-4

PINHOLE PLUGGING MAP

Filter I.D. No.: ATM-2-103 Operator: G Steele Date: 31 Jan 73

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



Comments: 1st grade - no breaks - a few nickel balls - all plugs less than one square - strong foil - no parlodion effect

ATM FILTER DATA SHEET

FRAME NUMBER ATM-2-103

1. Frame Data:

Date Received 11-23-70 By LLS.

Certification 2234

Cleaning:

Date N/A Operator PRECLEANED

Wash:

Lot

Lot

Lot

Lot

Bake Temp. N/A Time

2. Mounting:

Information on separate sheet.

3. Margining:

Date 11-17-71 Time 11-21 Operator RE

Width .100"

Epoxy

Epon 828 Lot 110H57 Amount 10.0 gm

Versamid 125 Lot 1FB524 Amount 10.0 gm

M.I.K. Lot 36782 Amount 40.0 gm

4. Prebake Photograph:

Date 11-18-71 Operator RE

5. Cold Cycle:

Date 11-22-71 Operator RE

Time in 0925 Temp. -20°C Time Out 1125

6. Sanitizing Bake:

Date 11-22-71 Operator RE

Time in 1305 Time out 1305

Temp. 100°C Pressure <100u

7. Pre Environmental Test Photograph:

Date 11-24-71 Operator RE

8. Environmental Testing:

Vibration and acoustic: Date 1-13-72 Carrier R-Gowin

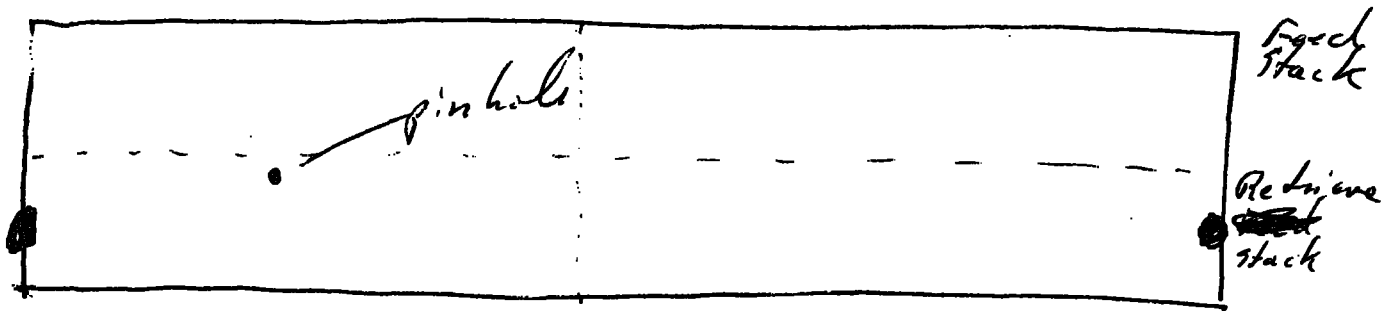
Vibration specs. BBRe letter — B6201-71-025

Acoustic specs. NDL-107-7149-3-10-70

9. Post Environmental Test Photograph: 2-12

Date 1-14-72 Operator R G

PINHOLE DISCOVERED AT TIME OF FINAL BLACKLIGHTING 3/22/73
– BOB MASON DISCRIPTION BELOW –



Seen looking from back

Appearance:

Pinhole was invisible to direct viewing, i.e. non-backlighted, even when approximate location was known.

When backlighted with high-intensity lamp, pinhole showed as bright point, i.e. more intense than appearance of the really tiny pinholes which show only faintly even under bright backlighting, but not glaring, as would be the case with a really large hole, one occupying a large fraction of a square.

FOIL MOUNTING

FOIL NUMBER 663
1300A

Date 11-16-71

Time 0930

Operator RE

Epoxy

Type Epico 210/110 MB Lot S-14 #1 Amt 20.0

Type Epico 180 Lot P1-003 #2 Amt 3.9

Type _____ Lot _____ Amt _____

Solvent _____ Lot _____ Amt _____

_____ Lot _____ Amt _____

Comments .010" squeeze

Frames

Type ATM-2- # 1031 Res. _____ # _____ Res. _____

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

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

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

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

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

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

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

Trim

Date 11-16-71

Time 1630

Operator RE

Comments _____

ENVIRONMENTAL TEST

DATE: 1-13-71 SIGMATRON CARRIER: Rashel Bowm

TEST LOCATION: Environmental Laboratory Pt. Mugu

VIBRATION TEST: BBRE Letter BB201-71-025

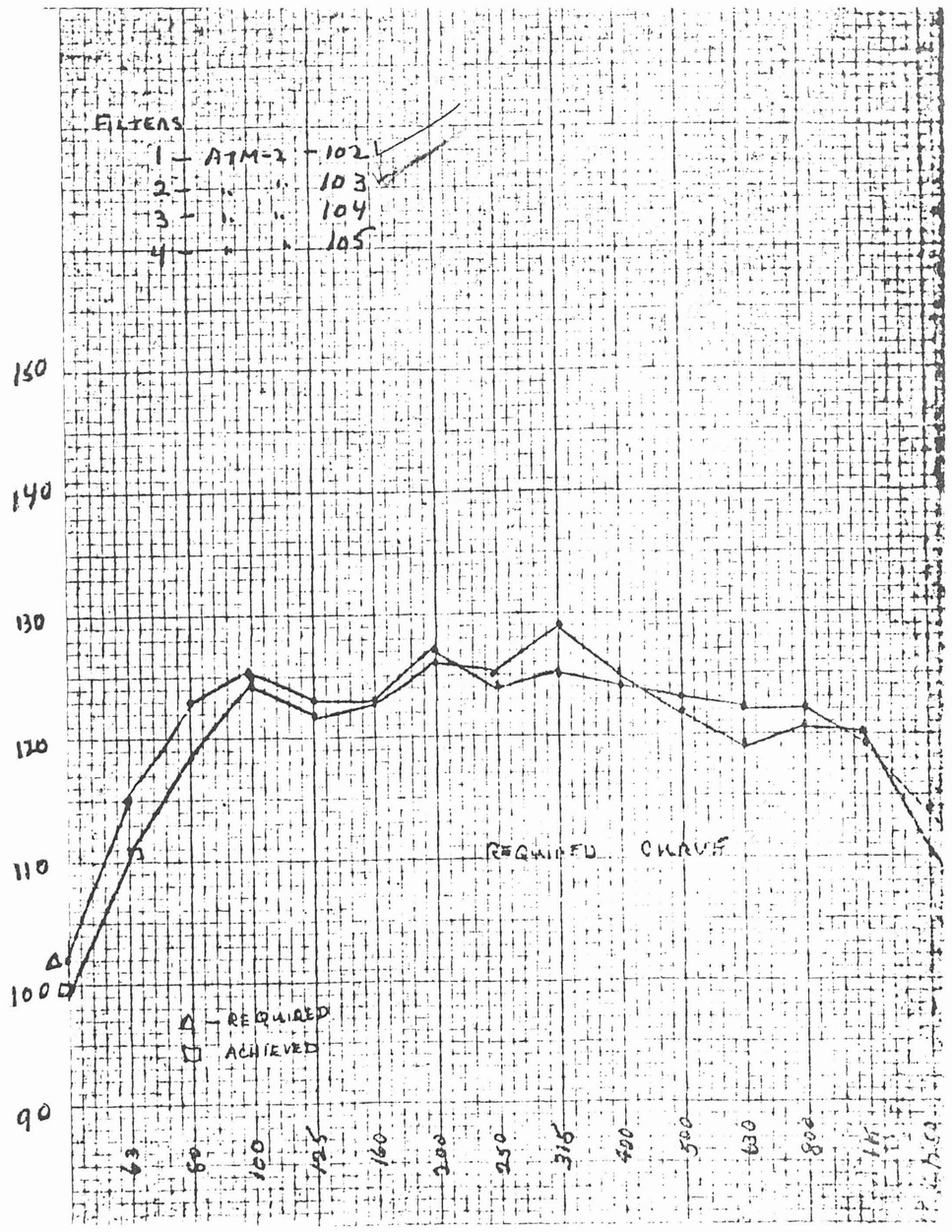
ACOUSTIC TEST: NRL - 107-7149 3-10-70

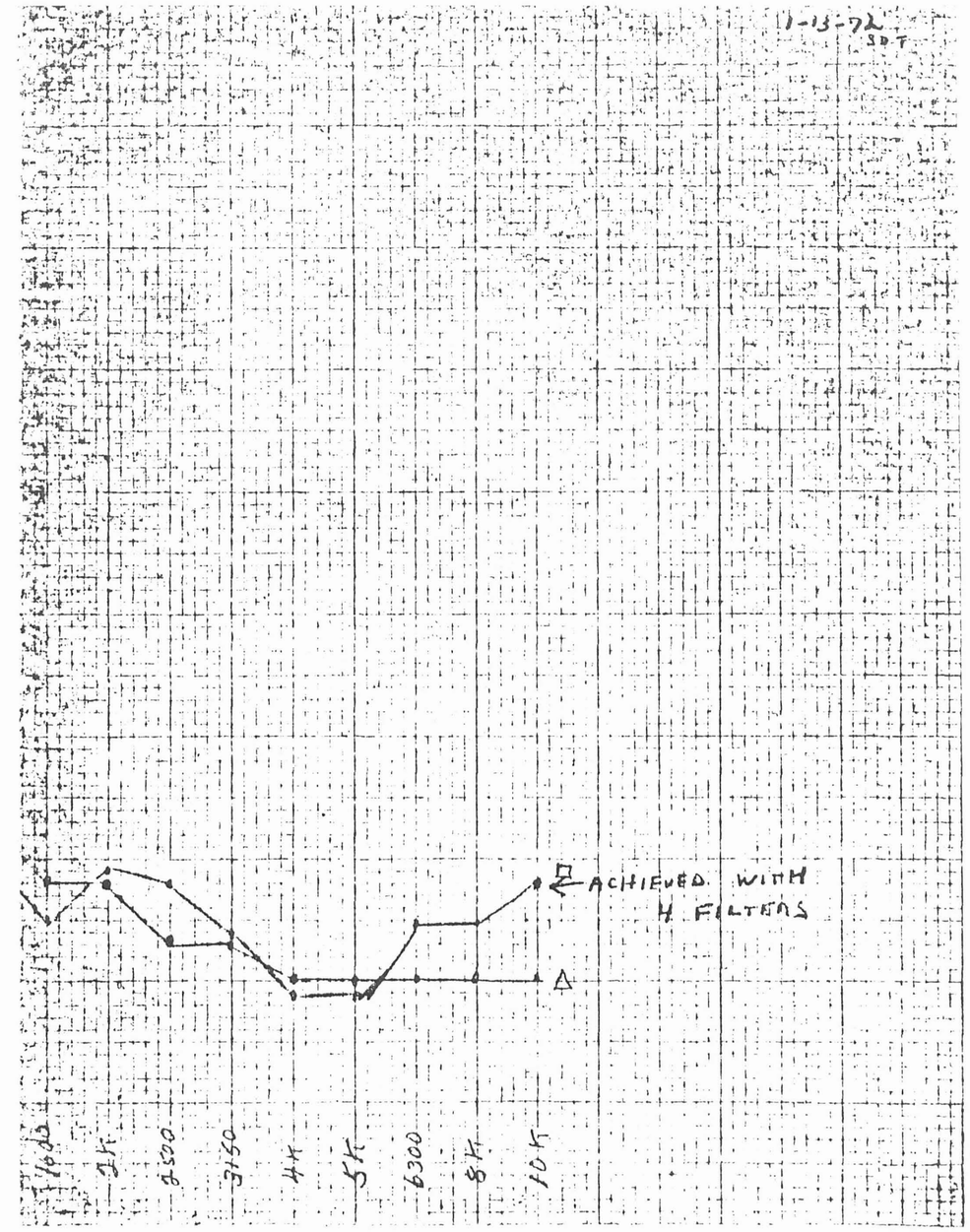
ITEM NO.	FILTER NO.
1	ATM-2-102
2	ATM-2-103
3	ATM-2-104
4	ATM-2-105

COMMENTS:

1000 acoustics

1300 vibration test
Random 3 min 3 axes.
20-150 Hz +3db/oct
150-600 Hz 0.1 g^2/H peak
600-2000 Hz -3db/oct 11.2 g's rms.
Sine 3 oct/minutes. x axis normal to filter
5-23 Hz. 0.089 inch D.A.
23-35 Hz 2.42 peak.
y axis lateral across the short axis
across the plane.
5-20 Hz 0.31g peak.
1640 test Completed.


FILTERS
1 - ATM-2 - 102
2 - " " 103
3 - " " 104
4 - " " 105
150
140
130
120
110
100
90
REQUIRED CHART
△ - REQUIRED
□ ACHIEVED
63
80
100
125
160
200
250
315
400
500
630
800
1K


1-13-72
ACHIEVED WITH
4 FILTERS
△
1600
2K
2500
3150
4K
5K
6300
8K
10K

MONITOR 1300 Å RUN 663 A

620-240

SUBSTRATE

Date 10/25/71 Operator [illegible]

Glass 0211-083792 Lot N/A

Cleaning method GS(Hn) ultS (30 min in new Micro bath)(2 min in new clean rinse bath) Water Rik - Rinse with Conductivity

Parlodion

Type 3.6 Lot 100177

Quantity 25 cc.

Time 1100

Installation

Date 10/26/71 Time 1330 Operator [illegible]

Method Used the jig for w per thin strip

SOURCE

Date 10/19/71 Operator [illegible] 1st (2nd) 3rd Run

Material: Filament lot: 5/07 Tantalum lot: 66187

Al 6% Si lot: P0 19.77 lot: lot:

DEPOSITION

		TIME	PRESSURE
Date 10/27/71 Operator [illegible]			
Pump down	DATE 10/26/71	1340	—
Bake out: Temp. N/A Time N/A		—	—
Start Ti pump	144	0915	2×10^{-6}
Fill cold trap		0900	6×10^{-6}
Fluorescein source on: @ .62A/0.1'/hr	10/26/71	1635	6.6×10^{-6}
Fluorescein run: Lot 8-3-100 Thickness 2375Å		1705	8.4×10^{-6}
Top SiO source on @ N/A Lot N/A		—	—
Bottom SiO source on @ N/A Lot N/A		—	—
LN through side plates		1120	1.2×10^{-7}
Ti pump off		1140	1.8×10^{-7}
Source on		1140	1.8×10^{-7}
Run @ 44 ts wide variations 172		1141	4×10^{-6}
Crystal frequency .5 to 1.1 Run # 42			
Warm up side plates		1145	4×10^{-7}
Substrate Removed	Date 10/27/71	1350	5.4×10^{-7}

Film No. 663

SCREEN PREPARATION

Date 11-9-71 Operator RE

Screen

Lot 137665 2-3

Lines/inch 70

Thickness .0007"

Orientation NORMAL

Pressing pressure N/A

Heat Treatment

Temp. 500°C

Time 1HR

#3 Method Hung vertically with 45 gm weight

~~Storage~~ and 2 3mil gold wire

SCREEN MOUNTING

Date 11-10-71 Operator RWR

Method Dry Stick/magnetic Chuck

SCREEN INSPECTION

Date 11-10-71 Operator RE

Comments NO BREAKS

CEMENTING

Date 11-10-71 Operator RE/ES

Cement		Proportion
Type Epon 828	Lot 11W#37	10.0
Type Versamid 125	Lot 1FB524	10.0
Solvent Chloroform	Lot 40672	570.0
	Lot	

Date Mixed 11-9-71 Operator RE

Spraying

Tank pressure 40 PSI

Fluid pressure 70

Atomizing pressure 30

Delta frequency 200Hz

Pressing

Pressure 3 PSI

Time 1651

RELEASING

Remove from press fixture and prepare for release

Date 11-11-71 Time 1640 Operator RE

Clamps yes, polyethylene in place

Release

Date 11-11-71 Time 1720 Operator RE

Solvent Acetone Lot 3806102

Remove from release bath and store

Date 11/12/71 Time 1010 Operator RWR

Wash solvent Acetone Lot J806102

Freon TF Lot 144-1A

FILTER TRANSMISSION DATA

FILTER NO.: ATM-2-103

DATE MEASURED, NRL: FEB 9 1973

OPERATOR: LMG

COMMENTS: PULSED SOURCE, 1P21 PMS

CHART DISPOSITION SENT WITH FILTER, BBRC, 12FEB73

WAVELENGTH	AVE. TRANSMISSION	WAVELENGTH	AVE. TRANSMISSION
192	51.0		
301	36.0		
461	24.0		
584	13.5		
728	8.0		

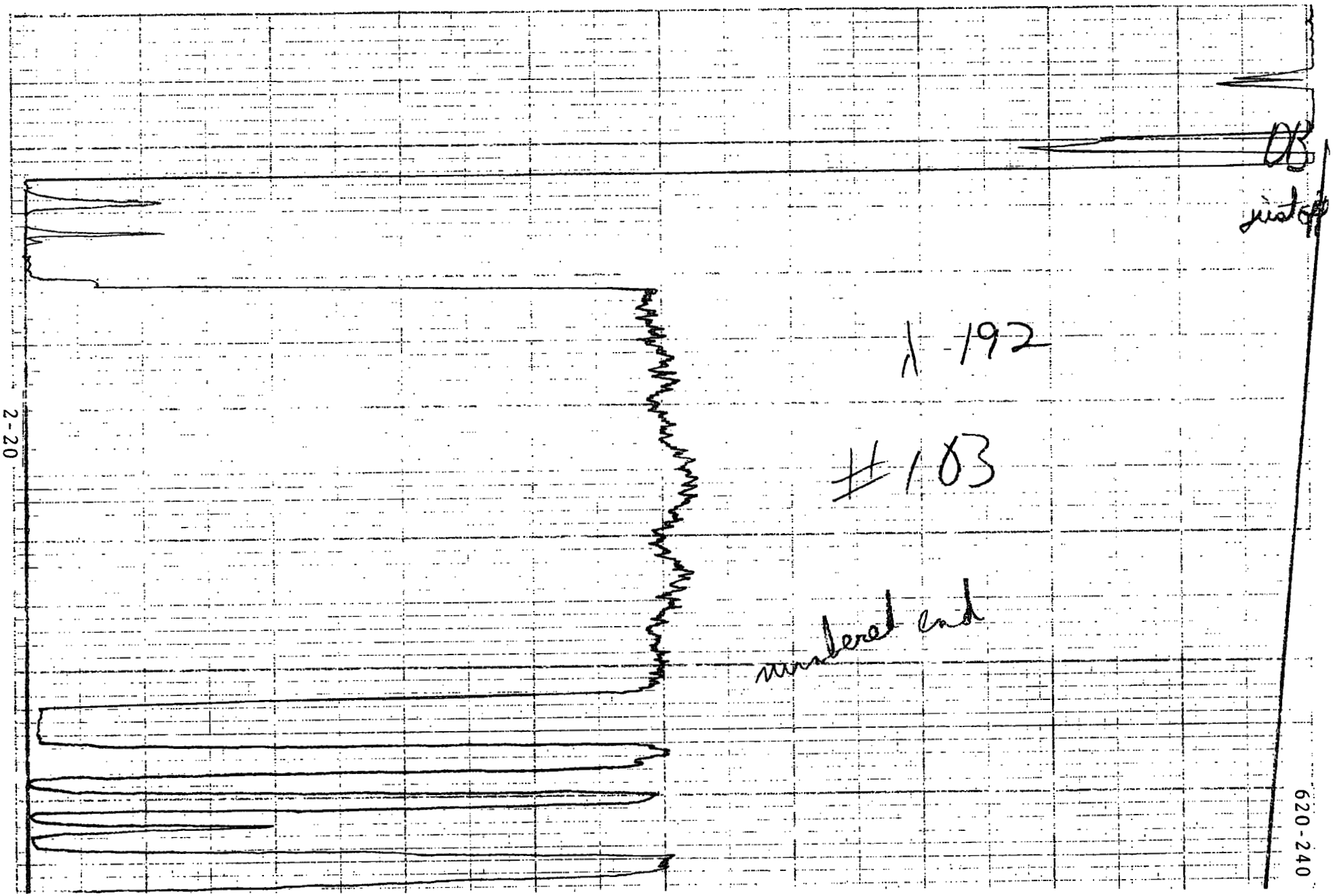


Figure 2-5 Post Flight Transmission Data (Sheet 1 of 5)

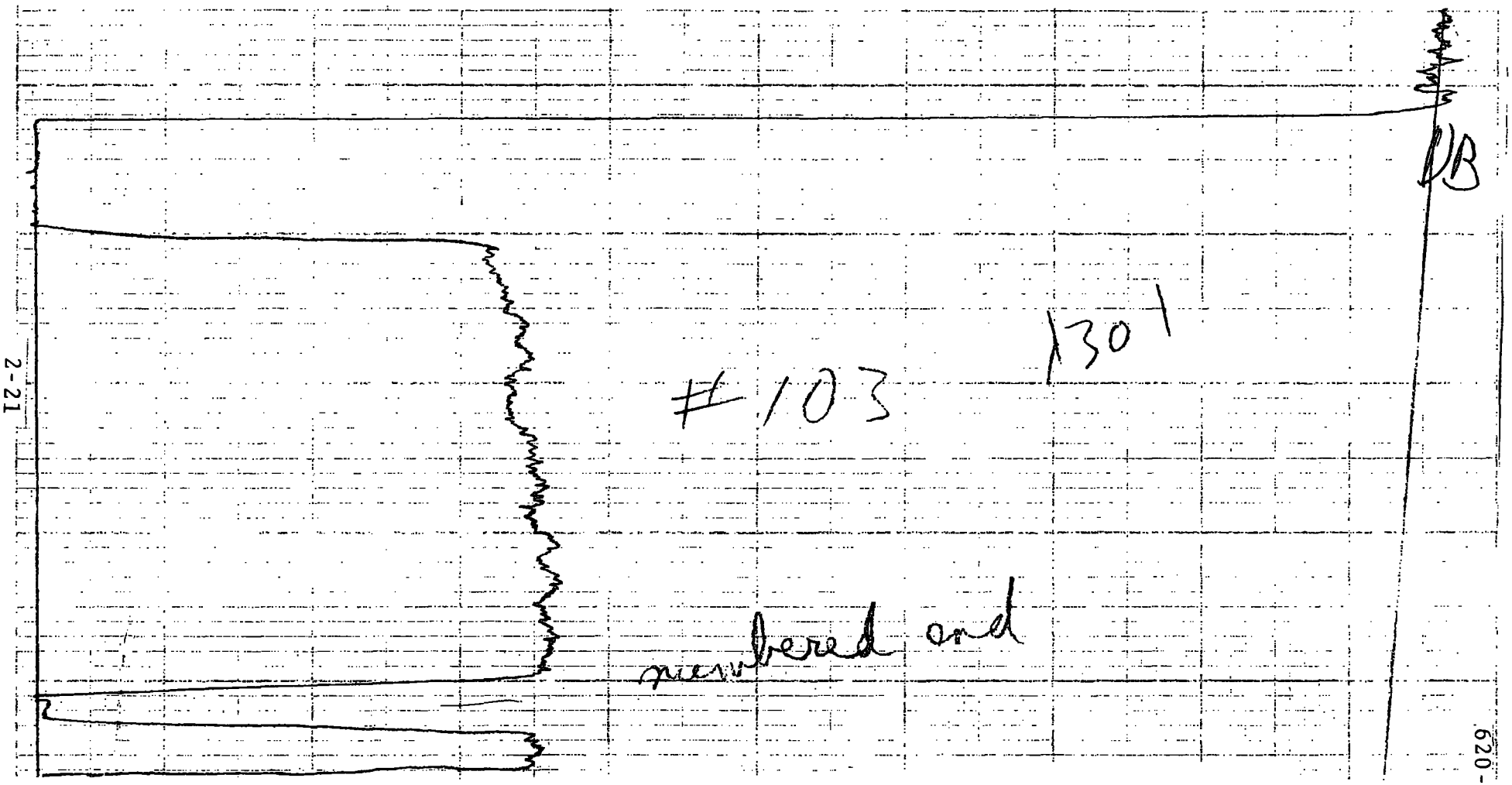


Figure 2-5 Post Flight Transmission Data (Sheet 2 of 5)

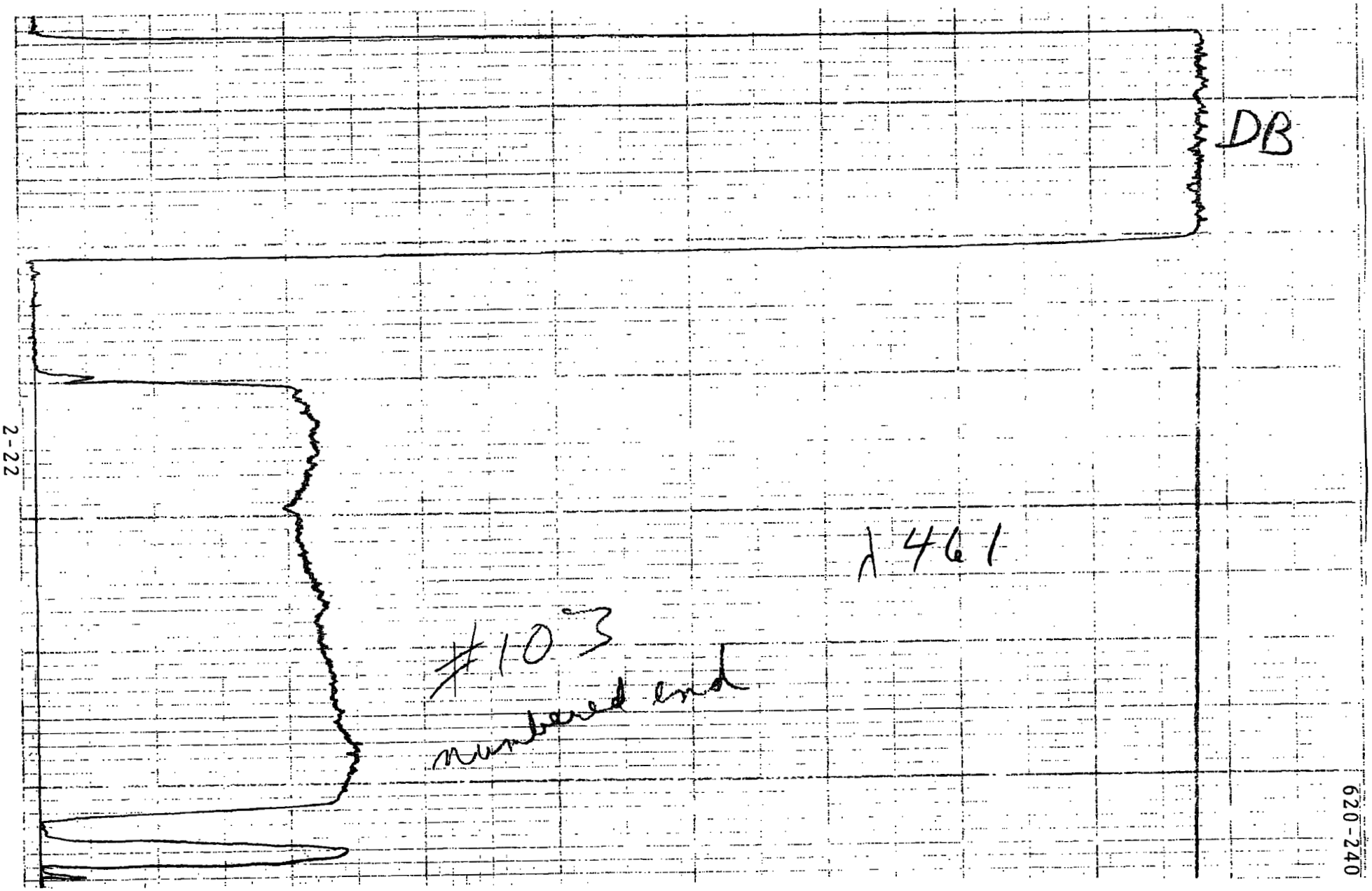


Figure 2-5 Post Flight Transmission Data (Sheet 3 of 5)

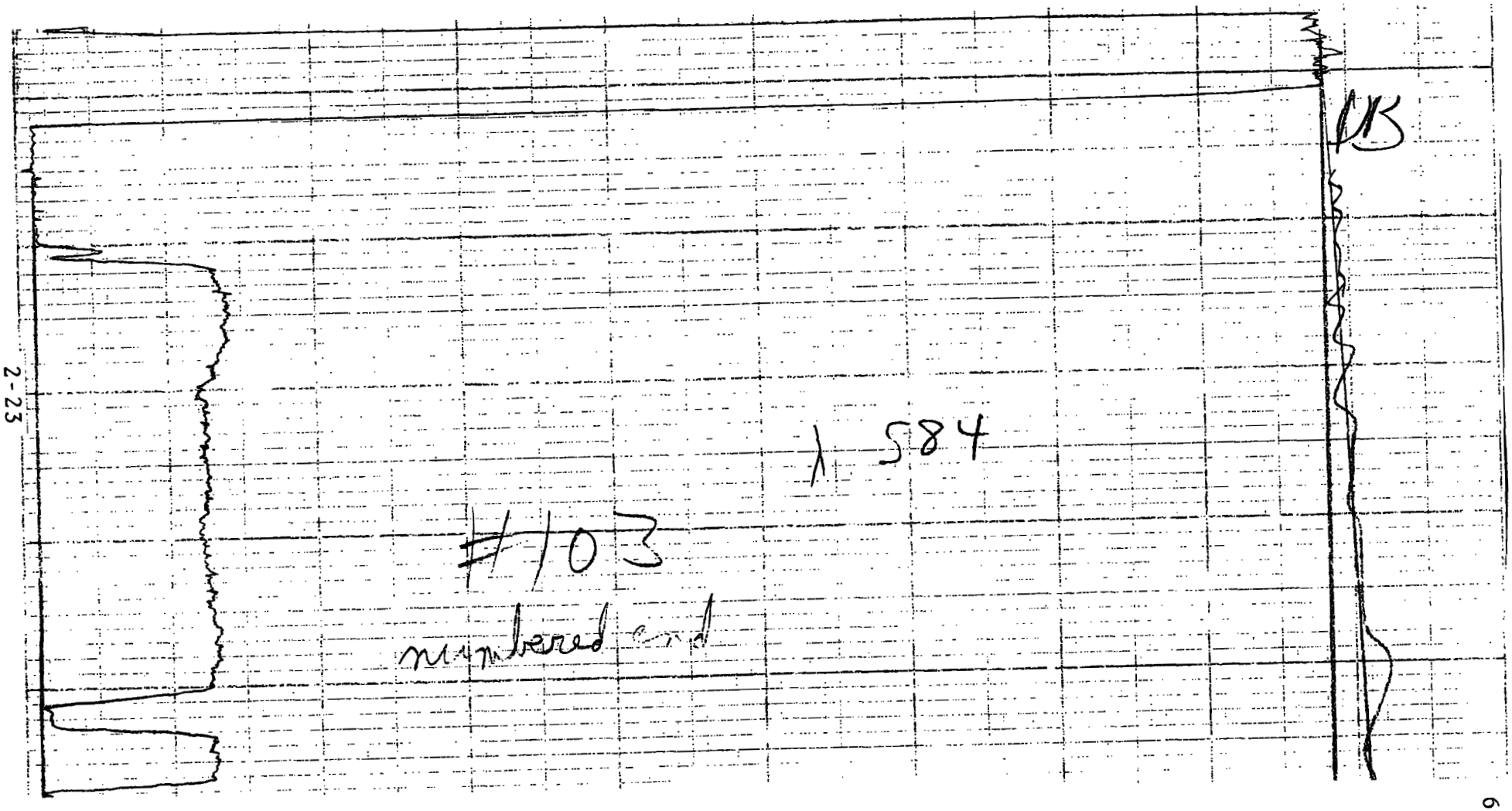


Figure 2-5 Post Flight Transmission Data (Sheet 4 of 5)

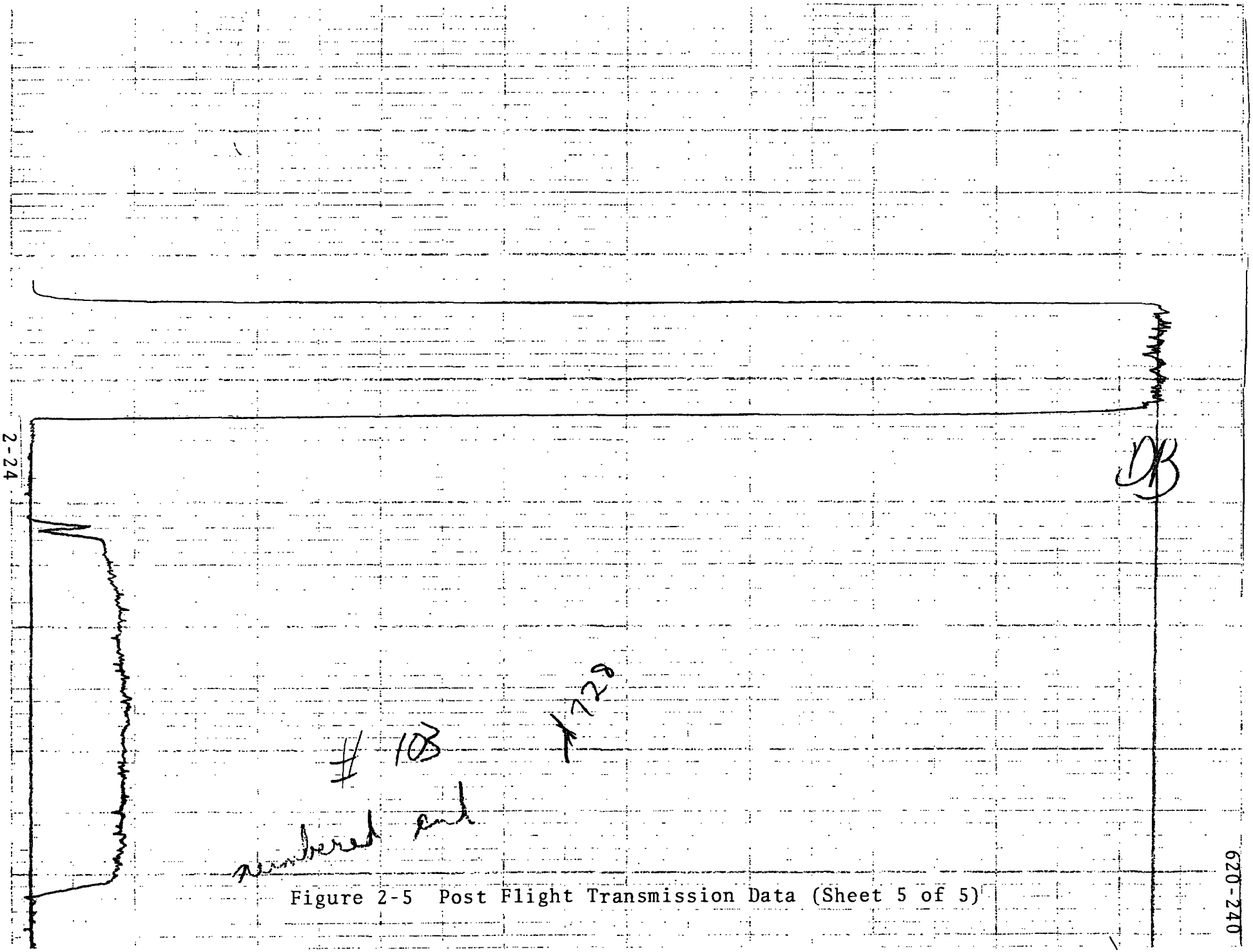


Figure 2-5 Post Flight Transmission Data (Sheet 5 of 5)

Table 2-4
Post Flight Measurements

TRANSMITTANCE OF ALUMINUM FILTER AT-103 TAKEN FROM CAMERA A-007.
MEASURED 27 JUNE 1973 L[illegible] POST FLIGHT MEASUREMENT
FILTER IS ORIENTED SO THAT POSITION 13 IS AT END NEAR INSCRIBED NUMBER.
POSITION 33 IS AT OPPOSITE END AND POSITION 23 IS IN CENTER.
VODAR 1P21 + SS PULSED DISCHARGE 35 PPS ARGON 45 MICRONS 10 KV

AVE LEN.	ANG. INC.	REFLEC.	PROB. ERR.	PERCENT ERR.		CHEM. SYM.
150	13.00	0.1299957	0.0016553	1.27		AL
150	23.00	0.1237544	0.0018577	1.50		AL
150	33.00	0.1119752	0.0021595	1.93		AL
150					V = 750 NCS1	AL
160	33.00	0.1114312	0.0012226	1.10		AL
160	23.00	0.1269633	0.0018549	1.46		AL
160	13.00	0.1319788	0.0016840	1.28		AL
160					V = 705 NCS1	AL
169	13.00	0.1436442	0.0013937	0.97		AL
169	23.00	0.1365391	0.0016912	1.24		AL
169	33.00	0.1197542	0.0013617	1.14		AL
169					V = 720 NCS1	AL
175	33.00	0.4573943	0.0062292	1.36		AL
175	23.00	0.4601470	0.0048125	1.05		AL
175	13.00	0.4439029	0.0056857	1.28		AL
175					V = 680 NCS1	AL
192	13.00	0.4824141	0.0039937	0.83		AL
192	23.00	0.4929205	0.0049519	1.00		AL
192	33.00	0.4741942	0.0043635	0.92		AL
192					V = 640 NCS1	AL
210	33.00	0.4281635	0.0029737	0.69		AL
210	23.00	0.4559919	0.0032122	0.70		AL
210	13.00	0.4253107	0.0032001	0.75		AL
210					V = 725 NCS1	AL
230	13.00	0.4252865	0.0023629	0.56		AL
230	23.00	0.4399610	0.0022280	0.51		AL
230	33.00	0.4091228	0.0023509	0.57		AL
230					V = 705 NCS1	AL
260	33.00	0.3475950	0.0032404	0.93		AL
260	23.00	0.3681886	0.0031348	0.85		AL
260	13.00	0.3659472	0.0040452	1.11		AL
260					V = 665 NCS1	AL

270	13.00	0.3697432	0.0015992	0.43		AL
270	23.00	0.3706631	0.0018479	0.50		AL
270	33.00	0.3524064	0.0026175	0.74		AL
270					V = 698 NCS1	AL
284	33.00	0.3549505	0.0012400	0.35		AL
284	23.00	0.3843422	0.0013434	0.35		AL
284	13.00	0.3704416	0.0010875	0.29		AL
284					V = 610 NCS1	AL
304	33.00	0.3566190	0.0010792	0.32		AL
304	23.00	0.3537667	0.0013328	0.38		AL
304	13.00	0.3501356	0.0016537	0.47		AL
304					V = 665 NCS1	AL
334	13.00	0.3350731	0.0008728	0.26		AL
334	23.00	0.3309058	0.0012851	0.39		AL
334	33.00	0.3143929	0.0011133	0.35		AL
334					V = 620 NCS1	AL
355	33.00	0.3073601	0.0011982	0.39		AL
355	23.00	0.3275490	0.0014961	0.46		AL
355	13.00	0.3206860	0.0015641	0.49		AL
355					V = 630 NCS1	AL
380	13.00	0.3032449	0.0013634	0.45		AL
380	23.00	0.3074204	0.0008694	0.28		AL
380	33.00	0.2941300	0.0010323	0.35		AL
380					V = 600 NCS1	AL
400	33.00	0.2779274	0.0010390	0.37		AL
400	23.00	0.2868441	0.0014100	0.49		AL
400	13.00	0.2940026	0.0015472	0.53		AL
400					V = 670 NCS1	AL
420	13.00	0.2932920	0.0010166	0.35		AL
420	23.00	0.2858446	0.0012155	0.43		AL
420	33.00	0.2714070	0.0010350	0.38		AL
420					V = 625 NCS1	AL
440	33.00	0.2451459	0.0010960	0.45		AL
440	23.00	0.2826898	0.0011689	0.41		AL
440	13.00	0.2614468	0.0011759	0.45		AL
440					V = 620 NCS1	AL
461	13.00	0.2661420	0.0008489	0.32		AL
461	23.00	0.2425665	0.0006973	0.29		AL
461	33.00	0.2529859	0.0007449	0.29		AL

461				V = 550 NCS1	AL
482	33.00	0.2129463	0.0009699	0.46	AL
482	23.00	0.2453383	0.0010308	0.42	AL
482	13.00	0.2440959	0.0010625	0.44	AL
482				V = 550 NCS1	AL
513	13.00	0.1983682	0.0007264	0.37	AL
513	23.00	0.2030008	0.0006370	0.31	AL
513	33.00	0.2094401	0.0006559	0.31	AL
513				V = 570 NCS1	AL
530	33.00	0.1906552	0.0010474	0.55	AL
530	23.00	0.1837738	0.0010110	0.55	AL
530	13.00	0.2145758	0.0012019	0.56	AL
530				V = 570 NCS1	AL
540	13.00	0.2077326	0.0011676	0.56	AL
540	23.00	0.1891473	0.0007627	0.40	AL
540	33.00	0.1599650	0.0010621	0.66	AL
540				V = 635 NCS1	AL
560	33.00	0.1491467	0.0009852	0.66	AL
560	23.00	0.1914794	0.0007196	0.38	AL
560	13.00	0.1694890	0.0008916	0.53	AL
560				V = 605 NCS1	AL
586	13.00	0.1292028	0.0005432	0.42	AL
586	23.00	0.1282364	0.0007612	0.59	AL
586	33.00	0.1497400	0.0008475	0.57	AL
586				V = 565 NCS1	AL
620	33.00	0.0878592	0.0004321	0.49	AL
620	23.00	0.1129061	0.0004924	0.44	AL
620	13.00	0.1399772	0.0006272	0.45	AL
620				V = 600 NCS1	AL
640	13.00	0.1087481	0.0004784	0.44	AL
640	23.00	0.1222581	0.0006251	0.51	AL
640	33.00	0.0885771	0.0004586	0.52	AL
640				V = 560 NCS1	AL
662	33.00	0.1386708	0.0013024	0.94	AL
662	23.00	0.1318343	0.0008933	0.68	AL
662	13.00	0.1230003	0.0009091	0.74	AL
662				V = 700 NCS1	AL

685	13.00	0.0704284	0.0004382	0.62	AL
685	23.00	0.0553467	0.0004978	0.90	AL
685	33.00	0.0534776	0.0006425	1.20	AL
685				V = 625 NCS1	AL
704	33.00	0.0529476	0.0003826	0.72	AL
704	23.00	0.0692997	0.0002920	0.42	AL
704	13.00	0.0858568	0.0004580	0.53	AL
704				V = 565 NCS1	AL
717	13.00	0.0737346	0.0004988	0.68	AL
717	23.00	0.0671876	0.0004059	0.60	AL
717	33.00	0.0467445	0.0003544	0.76	AL
717				V = 590 NCS1	AL

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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-007

FILM CAMERA LIFE HISTORY

CAMERA SER. NO. A007

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
Revision	C dated 1	5 February,	1973										
11-15-72	BBRC	Production Assembly									Ambient Clean Room		Completed
11-16-72	BBRC	Final Assy Inspection	NMR 27649	Damaged Electrical Cable	Poor Routing	Repair Cable					Ambient Clean Room		Completed
11-17-72 11-20-72	BBRC BBRC	Production Functional					517				Ambient Clean Room		Completed
11-20-72 11-21-72	BBRC	Pre-Acceptance Test	NMR 27785	Camera Lockout did not occur	High Forces	Polish and Re-lube Ratchet Wheel ramp corner and reset anti-backup pawl lift force to be within spec.	971				Ambient Clean Room		See Waiver #110 for Discussion of Lockout Problem.
11-22-72	BBRC	Vibration Test per Procedure 30559									Ambient Vibration		No Defect
11-23-72 11-27-72	BBRC	Thermal Vacuum Test					1173				Thermal Vacuum		No Defect
11-28-72	BBRC	Final Cleaning and Black Light Check					1182				Ambient Clean Room		No Defect
11-29-72	KSC	C^2F^2											No Defect

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.

620-240

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.

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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
1A201	JUN 7,73	158	18H 39M 40.00S	39M 44.75S	4.75S	LONG
1A202	JUN 8,73	159	2H 25M 38.50S	27M 17.50S	99.00S	LONG
1A203	JUN 9,73	160	1H 20M 20.00S	20M 28.50S	8.50S	SHORT
1A204	JUN 9,73	160	1H 27M 25.25S	27M 34.50S	9.25S	SHORT
1A205	JUN 9,73	160	13H 33M 3.50S	36M 22.25S	198.75S	LONG
1A206	JUN 9,73	160	13H 43M 32.25S	46M 51.25S	199.00S	LONG
1A207	JUN 9,73	160	19H 56M 40.50S	57M 0.25S	19.75S	LONG
1A208	JUN 9,73	160	19H 57M 2.25S	58M 21.75S	79.50S	LONG
1A209	JUN 9,73	160	19H 58M 24.00S	3M 42.25S	318.25S	LONG
1A210	JUN 9,73	160	21H 8M 20.25S	8M 30.00S	9.75S	SHORT
1A211	JUN 9,73	160	21H 8M 32.00S	9M 11.75S	39.75S	SHORT
1A212	JUN 9,73	160	21H 9M 13.75S	11M 53.00S	159.25S	SHORT
1A213	JUN 10,73	161	0H 17M 20.25S	22M 19.25S	299.00S	LONG
1A214	JUN 10,73	161	0H 35M 14.50S	35M 33.25S	18.75S	LONG
1A215	JUN 10,73	161	1H 46M 29.75S	47M 9.25S	39.50S	SHORT
1A216	JUN 10,73	161	16H 1M 48.50S	5M 7.50S	199.00S	LONG
1A217	JUN 10,73	161	16H 10M 49.75S	14M 8.50S	198.75S	LONG
1A218	JUN 10,73	161	17H 21M 13.50S	21M 23.25S	9.75S	SHORT
1A219	JUN 10,73	161	17H 21M 25.50S	22M 5.25S	39.75S	SHORT
1A220	JUN 10,73	161	17H 22M 7.25S	24M 46.50S	159.25S	SHORT
1A221	JUN 10,73	161	18H 59M 50.50S	4M 50.00S	299.50S	SHORT
1A222	JUN 10,73	161	19H 15M 54.25S	17M 33.00S	98.75S	SHORT
1A223	JUN 10,73	161	20H 23M 57.75S	24M 16.75S	19.00S	LONG
1A224	JUN 10,73	161	20H 33M 27.50S	34M 46.75S	79.25S	LONG
1A225	JUN 10,73	161	20H 50M 19.25S	50M 28.75S	9.50S	SHORT
1A226	JUN 10,73	161	21H 58M 36.25S	59M 15.50S	39.25S	SHORT
1A227	JUN 10,73	161	22H 26M 56.50S	27M 15.50S	19.00S	LONG
1A228	JUN 11,73	162	1H 10M 3.00S	10M 12.25S	9.25S	SHORT
1A229	JUN 11,73	162	1H 19M 28.00S	19M 38.00S	10.00S	SHORT
1A230	JUN 11,73	162	1H 40M 46.00S	42M 5.25S	79.25S	LONG
1A231	JUN 11,73	162	13H 42M 34.25S	45M 53.50S	199.25S	LONG
1A232	JUN 11,73	162	13H 52M 18.75S	55M 38.50S	199.75S	LONG
1A233	JUN 11,73	162	18H 10M 15.25S	10M 24.75S	9.50S	SHORT
1A234	JUN 11,73	162	0H 0M 0.00S	0M 0.00S	0.00S	BLANK
1A235	JUN 11,73	162	18H 30M 54.25S	32M 13.75S	79.50S	LONG
1A236	JUN 11,73	162	18H 32M 15.75S	37M 34.25S	318.50S	LONG
1A237	JUN 11,73	162	19H 45M 5.00S	34M 3.25S	2938.25S	LONG
1A238	JUN 11,73	162	21H 26M 26.50S	27M 45.50S	79.00S	SHORT
1A239	JUN 11,73	162	21H 40M 32.25S	43M 11.50S	159.25S	SHORT
1A240	JUN 12,73	163	0H 26M 58.50S	27M 8.50S	10.00S	SHORT
1A241	JUN 12,73	163	1H 2M 17.00S	2M 56.25S	39.25S	SHORT
1A242	JUN 12,73	163	1H 56M 9.75S	59M 29.00S	199.25S	LONG
1A243	JUN 12,73	163	14H 32M 14.50S	35M 33.25S	198.75S	LONG
1A244	JUN 12,73	163	14H 45M 3.25S	48M 22.25S	199.00S	LONG
1A245	JUN 12,73	163	16H 2M 14.25S	7M 13.00S	298.75S	LONG
1A246	JUN 12,73	163	16H 20M 14.50S	21M 54.00S	99.50S	SHORT
1A247	JUN 12,73	163	17H 32M 5.50S	32M 15.75S	10.25S	SHORT
1A248	JUN 12,73	163	17H 49M 15.50S	49M 35.75S	20.25S	LONG
1A249	JUN 12,73	163	18H 1M 25.75S	2M 44.75S	79.00S	SHORT
1A250	JUN 12,73	163	19H 16M 42.75S	17M 1.50S	18.75S	SHORT

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4/24/74

FILM NR	DATE	DOY	SHUTTER OPEN	CLOSE	EXP TIME	WAVELENGTH
1A251	JUN 12,73	163	19H 32M 5.25S	32M 44.50S	39.25S	LONG
1A252	JUN 12,73	163	20H 35M 37.25S	35M 56.50S	19.25S	LONG
1A253	JUN 12,73	163	20H 53M 35.50S	58M 34.25S	298.75S	LONG
1A254	JUN 12,73	163	21H 2M 4.00S	3M 43.25S	99.25S	LONG
1A255	JUN 12,73	163	21H 25M 6.75S	25M 16.50S	9.75S	SHORT
1A256	JUN 12,73	163	21H 25M 21.50S	25M 31.50S	10.00S	SHORT
1A257	JUN 12,73	163	21H 25M 36.50S	25M 46.50S	10.00S	SHORT
1A258	JUN 12,73	163	21H 25M 51.50S	26M 1.50S	10.00S	SHORT
1A259	JUN 12,73	163	22H 9M 53.25S	10M 3.00S	9.75S	SHORT
1A260	JUN 12,73	163	22H 10M 5.25S	10M 44.75S	39.50S	SHORT
1A261	JUN 12,73	163	22H 10M 47.00S	13M 26.00S	159.00S	SHORT
1A262	JUN 13,73	164	1H 19M 32.25S	20M 31.75S	59.50S	LONG
1A263	JUN 13,73	164	1H 28M 6.75S	29M 5.75S	59.00S	LONG
1A264	JUN 13,73	164	15H 37M 21.75S	40M 40.50S	198.75S	LONG
1A265	JUN 13,73	164	15H 45M 10.00S	48M 29.50S	199.50S	LONG
1A266	JUN 13,73	164	18H 19M 31.25S	19M 51.00S	19.75S	LONG
1A267	JUN 13,73	164	18H 19M 53.00S	20M 3.00S	10.00S	SHORT
1A268	JUN 13,73	164	18H 20M 5.00S	21M 24.50S	79.50S	LONG
1A269	JUN 13,73	164	18H 21M 26.50S	22M 6.25S	39.75S	SHORT
1A270	JUN 13,73	164	18H 22M 8.25S	27M 26.75S	318.50S	LONG
1A271	JUN 13,73	164	18H 27M 29.00S	30M 8.00S	159.00S	SHORT
1A272	JUN 13,73	164	19H 55M 37.00S	56M 56.50S	79.50S	LONG
1A273	JUN 13,73	164	19H 56M 58.50S	2M 17.00S	318.50S	LONG
1A274	JUN 13,73	164	20H 2M 19.00S	23M 33.25S	1274.25S	LONG
1A275	JUN 13,73	164	23H 0M 12.00S	0M 21.25S	9.25S	SHORT
1A276	JUN 14,73	165	0H 31M 41.75S	32M 1.00S	19.25S	LONG
1A277	JUN 14,73	165	0H 58M 55.75S	0M 35.00S	99.25S	LONG
1A278	JUN 14,73	165	1H 6M 27.00S	8M 6.00S	99.00S	LONG
1A279	JUN 14,73	165	6H 52M 0.00S	52M 19.75S	19.75S	LONG
1A280	JUN 14,73	165	6H 52M 21.75S	52M 31.75S	10.00S	SHORT
1A281	JUN 14,73	165	6H 52M 33.75S	53M 53.25S	79.50S	LONG
1A282	JUN 14,73	165	6H 53M 55.25S	54M 35.00S	39.75S	SHORT
1A283	JUN 14,73	165	6H 54M 37.00S	59M 55.50S	318.50S	LONG
1A284	JUN 14,73	165	6H 59M 57.50S	2M 36.75S	159.25S	SHORT
1A285	JUN 14,73	165	13H 22M 19.50S	25M 38.75S	199.25S	LONG
1A286	JUN 14,73	165	13H 39M 38.00S	42M 56.75S	198.75S	LONG
1A287	JUN 14,73	165	17H 40M 29.25S	40M 50.00S	20.75S	LONG
1A288	JUN 14,73	165	17H 48M 12.50S	49M 32.75S	80.25S	LONG
1A289	JUN 14,73	165	19H 9M 23.00S	9M 32.75S	9.75S	SHORT
1A290	JUN 14,73	165	19H 9M 34.75S	10M 14.50S	39.75S	SHORT
1A291	JUN 14,73	165	19H 10M 16.50S	12M 55.75S	159.25S	SHORT
1A292	JUN 14,73	165	19H 48M 58.25S	54M 17.75S	319.50S	LONG
1A293	JUN 14,73	165	20H 44M 36.00S	44M 45.75S	9.75S	SHORT
1A294	JUN 14,73	165	20H 44M 47.75S	45M 27.50S	39.75S	SHORT
1A295	JUN 14,73	165	20H 45M 29.50S	48M 8.75S	159.25S	SHORT
1A296	JUN 14,73	165	21H 22M 7.00S	22M 26.75S	19.75S	LONG
1A297	JUN 14,73	165	21H 22M 28.75S	23M 48.25S	79.50S	LONG
1A298	JUN 14,73	165	21H 23M 50.50S	27M 25.75S	215.25S	LONG
1A299	JUN 14,73	165	22H 16M 43.50S	17M 3.25S	19.75S	LONG
1A300	JUN 14,73	165	23H 51M 2.50S	51M 51.25S	48.75S	LONG

Note: See 1A402 for next exposure

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FILM NR	DATE	DOY	SHUTTER OPEN	CLOSE	EXP TIME	WAVELENG
1A301	JUN 15.73	166	5H 6M 24.75S	6M 44.50S	19.75S	LONG
1A302	JUN 15.73	166	5H 6M 46.50S	6M 56.50S	10.00S	SHORT
1A303	JUN 15.73	166	5H 6M 58.50S	8M 18.00S	79.50S	LONG
1A304	JUN 15.73	166	5H 8M 20.00S	8M 59.75S	39.75S	SHORT
1A305	JUN 15.73	166	5H 9M 1.75S	11M 41.00S	159.25S	SHORT
1A306	JUN 15.73	166	5H 11M 43.00S	17M 1.50S	318.50S	LONG
1A307	JUN 15.73	166	10H 56M 51.25S	0M 10.75S	199.50S	LONG
1A308	JUN 15.73	166	11H 4M 36.75S	7M 55.75S	199.00S	LONG
1A309	JUN 15.73	166	12H 18M 46.25S	19M 6.25S	20.00S	LONG
1A310	JUN 15.73	166	12H 59M 49.00S	59M 50.50S	1.50S	SHORT
1A311	JUN 15.73	166	13H 52M 38.50S	53M 57.25S	78.75S	LONG
1A312	JUN 15.73	166	14H 11M 38.00S	11M 40.50S	2.50S	SHORT
1A313	JUN 15.73	166	14H 11M 42.50S	11M 52.50S	10.00S	SHORT
1A314	JUN 15.73	166	14H 11M 54.50S	12M 34.25S	39.75S	SHORT
1A315	JUN 15.73	166	14H 12M 36.25S	12M 41.00S	4.75S	LONG
1A316	JUN 15.73	166	14H 12M 43.25S	13M 3.00S	19.75S	LONG
1A317	JUN 15.73	166	14H 13M 5.00S	14M 24.50S	79.50S	LONG
1A318	JUN 15.73	166	14H 14M 26.75S	14M 29.00S	2.25S	SHORT
1A319	JUN 15.73	166	14H 14M 31.00S	14M 41.00S	10.00S	SHORT
1A320	JUN 15.73	166	14H 14M 43.00S	15M 22.75S	39.75S	SHORT
1A321	JUN 15.73	166	14H 15M 24.75S	15M 34.50S	9.75S	SHORT
1A322	JUN 15.73	166	14H 15M 36.75S	16M 16.50S	39.75S	SHORT
1A323	JUN 15.73	166	14H 16M 18.50S	18M 57.75S	159.25S	SHORT
1A324	JUN 15.73	166	14H 18M 59.75S	19M 9.50S	9.75S	LONG
1A325	JUN 15.73	166	14H 19M 11.50S	19M 51.25S	39.75S	LONG
1A326	JUN 15.73	166	14H 19M 53.50S	22M 32.50S	159.00S	LONG
1A327	JUN 15.73	166	14H 22M 34.50S	22M 37.00S	2.50S	SHORT
1A328	JUN 15.73	166	14H 22M 39.00S	22M 49.00S	10.00S	SHORT
1A329	JUN 15.73	166	14H 22M 51.00S	23M 30.75S	39.75S	SHORT
1A330	JUN 15.73	166	14H 23M 32.75S	23M 42.50S	9.75S	SHORT
1A331	JUN 15.73	166	14H 23M 44.75S	24M 24.50S	39.75S	SHORT
1A332	JUN 15.73	166	14H 24M 26.50S	27M 5.75S	159.25S	SHORT
1A333	JUN 15.73	166	14H 27M 7.75S	27M 17.50S	9.75S	LONG
1A334	JUN 15.73	166	14H 27M 19.50S	27M 59.25S	39.75S	LONG
1A335	JUN 15.73	166	14H 28M 1.25S	30M 40.50S	159.25S	LONG
1A336	JUN 15.73	166	14H 33M 49.75S	33M 52.00S	2.25S	SHORT
1A337	JUN 15.73	166	14H 33M 54.00S	34M 4.00S	10.00S	SHORT
1A338	JUN 15.73	166	14H 34M 6.00S	34M 45.75S	39.75S	SHORT
1A339	JUN 15.73	166	14H 34M 47.75S	34M 52.75S	5.00S	LONG
1A340	JUN 15.73	166	14H 34M 54.75S	35M 14.50S	19.75S	LONG
1A341	JUN 15.73	166	14H 35M 16.50S	36M 36.25S	79.75S	LONG
1A342	JUN 15.73	166	14H 36M 38.25S	36M 40.50S	2.25S	SHORT
1A343	JUN 15.73	166	14H 36M 42.75S	36M 52.50S	9.75S	SHORT
1A344	JUN 15.73	166	14H 36M 54.50S	37M 34.25S	39.75S	SHORT
1A345	JUN 15.73	166	14H 37M 36.25S	37M 46.25S	10.00S	SHORT
1A346	JUN 15.73	166	14H 37M 48.25S	38M 28.00S	39.75S	SHORT
1A347	JUN 15.73	166	14H 38M 30.00S	38M 42.00S	12.00S	SHORT
1A348	JUN 15.73	166	15H 22M 0.50S	22M 10.25S	9.75S	SHORT
1A349	JUN 15.73	166	15H 32M 10.50S	32M 20.25S	9.75S	SHORT
1A350	JUN 15.73	166	15H 42M 50.25S	42M 59.25S	9.00S	SHORT

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FILM NR	DATE	DOY	SHUTTER OPEN	CLOSE	EXP TIME	WAVELENGTH
1A351	JUN 15,73	166	15H 53M 9.25S	53M 18.50S	9.25S	SHORT
1A352	JUN 15,73	166	16H 5M 48.50S	5M 58.50S	10.00S	SHORT
1A353	JUN 15,73	166	16H 55M 1.00S	55M 3.50S	2.50S	SHORT
1A354	JUN 15,73	166	16H 55M 5.50S	55M 15.50S	10.00S	SHORT
1A355	JUN 15,73	166	16H 55M 17.50S	55M 57.25S	39.75S	SHORT
1A356	JUN 15,73	166	18H 29M 11.00S	30M 29.50S	78.50S	LONG
1A357	JUN 15,73	166	18H 50M 42.50S	50M 47.75S	5.25S	LONG
1A358	JUN 15,73	166	20H 15M 57.25S	16M 7.00S	9.75S	SHORT
1A359	JUN 15,73	166	20H 27M 32.00S	27M 34.00S	2.00S	SHORT
1A360	JUN 15,73	166	20H 33M 22.00S	33M 31.75S	9.75S	SHORT
1A361	JUN 15,73	166	21H 49M 40.25S	49M 59.75S	19.50S	LONG
1A362	JUN 16,73	167	10H 13M 51.50S	14M 40.25S	48.75S	LONG
1A363	JUN 16,73	167	10H 26M 10.75S	27M 0.25S	49.50S	LONG
1A364	JUN 16,73	167	17H 54M 18.00S	54M 22.75S	4.75S	LONG
1A365	JUN 16,73	167	17H 54M 25.00S	54M 44.75S	19.75S	LONG
1A366	JUN 16,73	167	17H 54M 46.75S	56M 6.25S	79.50S	LONG
1A367	JUN 16,73	167	20H 55M 47.75S	55M 57.50S	9.75S	LONG
1A368	JUN 16,73	167	21H 4M 2.50S	4M 12.50S	10.00S	LONG
1A369	JUN 16,73	167	21H 30M 51.50S	39M 57.25S	545.75S	DBL EX -
1A370	JUN 17,73	168	9H 32M 38.50S	33M 27.75S	49.25S	LONG
1A371	JUN 17,73	168	12H 44M 55.50S	44M 59.25S	3.75S	LONG
1A372	JUN 17,73	168	15H 47M 56.00S	48M 1.00S	5.00S	LONG
1A373	JUN 17,73	168	15H 48M 3.00S	48M 22.75S	19.75S	LONG
1A374	JUN 17,73	168	15H 48M 25.00S	49M 44.50S	79.50S	LONG
1A375	JUN 17,73	168	17H 5M 2.00S	5M 11.75S	9.75S	SHORT
1A376	JUN 17,73	168	17H 5M 13.75S	5M 53.50S	39.75S	SHORT
1A377	JUN 17,73	168	17H 5M 55.50S	8M 34.75S	159.25S	SHORT
1A378	JUN 17,73	168	21H 51M 28.75S	51M 38.75S	10.00S	LONG
1A379	JUN 17,73	168	21H 59M 53.75S	0M 3.75S	10.00S	LONG
1A380	JUN 18,73	169	10H 21M 5.75S	21M 54.75S	49.00S	LONG
1A381	JUN 18,73	169	10H 29M 51.00S	30M 39.75S	48.75S	LONG
1A382	JUN 18,73	169	12H 3M 3.75S	3M 7.50S	3.75S	LONG
1A383	JUN 18,73	169	12H 19M 3.50S	19M 13.50S	10.00S	LONG
1A384	JUN 18,73	169	15H 12M 45.75S	12M 48.00S	2.25S	SHORT
1A385	JUN 18,73	169	15H 12M 50.00S	13M 0.00S	10.00S	SHORT
1A386	JUN 18,73	169	15H 13M 2.00S	13M 41.75S	39.75S	SHORT
1A387	JUN 18,73	169	16H 22M 31.25S	22M 41.00S	9.75S	SHORT
1A388	JUN 18,73	169	16H 31M 31.50S	31M 41.75S	10.25S	SHORT
1A389	JUN 18,73	169	21H 5M 31.50S	5M 41.50S	10.00S	LONG
1A390	JUN 18,73	169	21H 33M 11.50S	33M 21.50S	10.00S	LONG
1A391	JUN 18,73	169	21H 38M 41.50S	39M 57.50S	76.00S	LONG
1A392	JUN 18,73	169	21H 40M 19.00S	41M 38.25S	79.25S	LONG
1A393	JUN 18,73	169	21H 45M 1.50S	45M 11.25S	9.75S	LONG
1A394	JUN 19,73	170	6H 29M 45.00S	30M 4.75S	19.75S	LONG
1A395	JUN 19,73	170	6H 30M 6.75S	30M 16.75S	10.00S	SHORT
1A396	JUN 19,73	170	6H 30M 18.75S	31M 38.25S	79.50S	LONG
1A397	JUN 19,73	170	6H 31M 40.25S	32M 20.00S	39.75S	SHORT
1A398	JUN 19,73	170	6H 32M 22.00S	37M 40.50S	318.50S	LONG
1A399	JUN 19,73	170	6H 37M 42.50S	40M 21.75S	159.25S	SHORT
1A400	JUN 19,73	170	0H 0M 0.00S	0M 0.00S	0.00S	BLANK

1A401	JUN 19.73	170	0H 0M 0.00S	0M 0.00S	0.00S	BLANK
1A402	JUN 14.73	165	23H 59M 30.50S	0M 19.25S	48.75S	LONG

NOTE: 1A-402 Exposed Between 1A-300 and 1A-301.

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.

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.

Rev A

DATE	TIME	FILM-STRIP	D/N	JOP-ST	BB	TGT	EXP	WVL
JUN 7	158:16:39	1A-201	205	EVA		UNK	:05	L
JUN 8	159:02:25	1A-202	210	02A-7	10	31	1:39	L
JUN 9	160:01:20	1A-203	225	06 -1	01A	SC	:09	S
JUN 9	160:01:27	1A-204	225	06 -1	01B	SC	:09	S
JUN 9	160:13:33	1A-205	233	06 -1	01A	SC	03:19	L
JUN 9	160:13:43	1A-206	233	06 -1	01B	SC	03:19	L
JUN 9	160:19:56	1A-207	237	02B-2	05	18	:20	L
JUN 9	160:19:57	1A-208	237	02B-2	05	18	01:20	L
JUN 9	160:19:58	1A-209	237	02B-2	05	18	05:18	L
JUN 9	160:21:08	1A-210	238	02A-1	04A	31	:10	S
JUN 9	160:21:08	1A-211	238	02A-1	04A	31	:40	S
JUN 9	160:21:09	1A-212	238	02A-1	04A	31	02:40	S
JUN 10	161:00:17	1A-213	240	01A-1	03	NC1	04:59	L
JUN 10	161:00:35	1A-214	240	01A-1	07	NC1	:19	L
JUN 10	161:01:46	1A-215	241	06 -1	01	SC	:40	S
JUN 10	161:16:01	1A-216	250	06 -1	01A	SC	03:19	L
JUN 10	161:16:10	1A-217	250	06 -1	01B	SC	03:19	L
JUN 10	161:17:21	1A-218	251	02C-2	05	37	:10	S
JUN 10	161:17:21	1A-219	251	02C-2	05	37	:40	S
JUN 10	161:17:22	1A-220	251	02C-2	05	37	02:39	S
JUN 10	161:18:59	1A-221	252	01B-1	03	NC1	05:00	S
JUN 10	161:19:15	1A-222	252	01B-1	03	NC1	01:39	S
JUN 10	161:20:23	1A-223	253	01B-3	11	NC1	:19	L
JUN 10	161:20:33	1A-224	253	01B-4	06	NC1	01:19	L
JUN 10	161:20:50	1A-225	253	01B-5	11	NC1	:10	S
JUN 10	161:21:58	1A-226	254	01B-6	06	NC1	:39	S
JUN 10	161:22:26	1A-227	254	02B-3	07	37	:19	L
JUN 11	162:01:10	1A-228	256	06 -1	01A	SC	:09	S
JUN 11	162:01:19	1A-229	256	06 -1	01B	SC	:10	S
JUN 11	162:01:40	1A-230	256	02B-3	07	31	1:19	L
JUN 11	162:13:42	1A-231	264	06 -1	01A	SC	03:19	L
JUN 11	162:13:52	1A-232	264	06 -1	01	SC	03:20	L
JUN 11	162:18:10	1A-233	267	06 -2	02	SC	:10	S
JUN 11	162:18:30	1A-234	267	02C-2	05	37	:40	L
JUN 11	162:18:30	1A-235	267	02C-2	05	37	01:20	L
JUN 11	162:18:32	1A-236	267	02C-2	05	37	05:19	L
JUN 11	162:19:45	1A-237	268	02C-5	23	37	48:58	L
JUN 11	162:21:26	1A-238	269	02E-1	06	31	01:19	S
JUN 11	162:21:40	1A-239	269	02E-2	06	31	02:39	S

DATE	TIME	FILM-STRIP	D/N	JOP-ST	BR	TGT	EXP	WVL
JUN 12	163:00:26	1A-240	271	11 -2	10	31	:10	S
JUN 12	163:01:02	1A-241	271	11 -5	10	31	:39	S
JUN 12	163:01:56	1A-242	272	06 -1	01A	SC	03:19	L
JUN 12	163:14:32	1A-243	280	06 -1	01	SC	03:19	L
JUN 12	163:14:45	1A-244	280	06 -1	01	SC	03:19	L
JUN 12	163:16:02	1A-245	281	04 -2	03	P81	04:59	L
JUN 12	163:16:20	1A-246	281	04 -3	03	P81	01:40	S
JUN 12	163:17:32	1A-247	282	04 -3	06	P81	:10	S
JUN 12	163:17:49	1A-248	282	02B-3	07	37	:20	L
JUN 12	163:18:01	1A-249	282	02B-3	11	37	01:19	S
JUN 12	163:19:16	1A-250	283	01D-1	03	BS1	:19	S
JUN 12	163:19:30	1A-251	283	01D-2	03	BS1	02:29	L
JUN 12	163:20:35	1A-252	284	01D-3	06	BS1	:19	L
JUN 12	163:20:53	1A-253	284	01D-4	11	BS1	04:59	L
JUN 12	163:21:02	1A-254	284	01D-5	06	BS1	01:39	L
JUN 12	163:21:25	1A-255	284	07 -2	15	31	:10	S
JUN 12	163:21:25	1A-256	284	07 -2	15	31	:10	S
JUN 12	163:21:25	1A-257	284	07 -2	15	31	:10	S
JUN 12	163:21:25	1A-258	284	07 -2	15	31	:10	S
JUN 12	163:22:09	1A-259	285	02B-1	04	31	:10	S
JUN 12	163:22:10	1A-260	285	02B-1	04	31	:40	S
JUN 12	163:22:10	1A-261	285	02B-1	04	31	02:39	S
JUN 13	164:01:19	1A-262	287	06 -1	01	SC	01:00	L
JUN 13	164:01:28	1A-263	287	06 -1	01	SC	:59	L
JUN 13	164:15:37	1A-264	296	06 -1	01	SC	03:19	L
JUN 13	164:15:45	1A-265	296	06 -1	01	SC	03:20	L
JUN 13	164:18:19	1A-266	298	12B-1	22	37	:20	L
JUN 13	164:18:19	1A-267	298	12B-1	22	37	:10	S
JUN 13	164:18:20	1A-268	298	12B-1	22	37	01:20	L
JUN 13	164:18:21	1A-269	298	12B-1	22	37	:40	S
JUN 13	164:18:22	1A-270	298	12B-1	22	37	05:19	L
JUN 13	164:18:27	1A-271	298	12B-1	22	37	02:39	S
JUN 13	164:19:55	1A-272	299	12B-2	13	LB1	01:20	L
JUN 13	164:19:56	1A-273	299	12B-2	13	LB1	05:19	L
JUN 13	164:20:02	1A-274	299	12B-2	13	LB1	21:14	L
JUN 13	164:23:00	1A-275	301	12B-3	06	LB1	:09	S
JUN 14	165:00:31	1A-276	302	12B-3	06	LB1	:19	L
JUN 14	165:00:58	1A-277	302	06 -1	01	SC	01:39	L
JUN 14	165:01:06	1A-278	302	06 -1	01	SC	01:39	L

DATE	TIME	FILM-STRIP	D/N	JOP-ST	BR	TGT	EXP	WVL
JUN 14	165:06:52	1A-279	306	UNA		UNK	:20	L
JUN 14	165:06:52	1A-280	306	UNA		UNK	:10	S
JUN 14	165:06:52	1A-281	306	UNA		UNK	01:20	L
JUN 14	165:06:53	1A-282	306	UNA		UNK	:40	S
JUN 14	165:06:54	1A-283	306	UNA		UNK	05:19	L
JUN 14	165:06:59	1A-284	306	UNA		UNK	02:39	S
JUN 14	165:13:22	1A-285	310	06 -1	01	SC	03:19	L
JUN 14	165:13:39	1A-286	310	06 -1	01	SC	03:19	L
JUN 14	165:17:40	1A-287	313	02A-7	10	37	:21	L
JUN 14	165:17:48	1A-288	313	02A-6	07	37	01:20	L
JUN 14	165:19:09	1A-289	314	02A-1	04	37	:10	S
JUN 14	165:19:09	1A-290	314	02A-1	04	37	:40	S
JUN 14	165:19:10	1A-291	314	02A-1	04	37	02:39	S
JUN 14	165:19:48	1A-292	314	06 -2	02	SC	05:20	L
JUN 14	165:20:44	1A-293	315	02A-1	04	37	:10	S
JUN 14	165:20:44	1A-294	315	02A-1	04	37	:40	S
JUN 14	165:20:45	1A-295	315	02A-1	04	37	02:39	S
JUN 14	165:21:22	1A-296	315	02A-1	04	37	:20	L
JUN 14	165:21:22	1A-297	315	02A-1	04	37	01:20	L
JUN 14	165:21:23	1A-298	315	04 -8	11	F79	03:35	L
JUN 14	165:22:16	1A-299	316	04 -7	06	F79	:20	L
JUN 14	165:23:51	1A-300	317	06 -1	01	SC	:49	L
JUN 14	165:23:59	1A-402	317	06 -1	01	SC	:49	L
JUN 15	166:05:06	1A-301	320	UNA		SC	:20	L
JUN 15	166:05:06	1A-302	320	UNA		SC	:10	S
JUN 15	166:05:06	1A-303	320	UNA		SC	01:20	L
JUN 15	166:05:08	1A-304	320	UNA		SC	:40	S
JUN 15	166:05:09	1A-305	320	UNA		SC	02:39	S
JUN 15	166:05:11	1A-306	320	UNA		SC	05:19	L
JUN 15	166:10:56	1A-307	324	06 -1	01	SC	03:20	L
JUN 15	166:11:04	1A-308	324	06 -1	01	SC	03:19	L
JUN 15	166:12:18	1A-309	325	04 -6	03	F79	:20	L
JUN 15	166:12:59	1A-310	325	04 -7	06	F79	:02	S
JUN 15	166:13:52	1A-311	326	04 -2	03	P84	01:19	L
JUN 15	166:14:11	1A-312	326	03A	08	31	:03	S
JUN 15	166:14:11	1A-313	326	03A	08	31	:10	S
JUN 15	166:14:11	1A-314	326	03A	08	31	:40	S
JUN 15	166:14:12	1A-315	326	03A	08	31	:05	L
JUN 15	166:14:12	1A-316	326	03A	08	31	:20	L

DATE	TIME	FILM-STRIP	D/N	JOB-ST	BB	TGT	EXP	WVL
JUN 15	166:14:13	1A-317	326	03A	08	31	01:20	L
JUN 15	166:14:14	1A-318	326	03A	08	31	:02	S
JUN 15	166:14:14	1A-319	326	03A	08	31	:10	S
JUN 15	166:14:14	1A-320	326	03A	08	31	:40	S
JUN 15	166:14:15	1A-321	326	03A	08	31	:10	S
JUN 15	166:14:15	1A-322	326	03A	08	31	:40	S
JUN 15	166:14:16	1A-323	326	03A	08	31	02:39	S
JUN 15	166:14:18	1A-324	326	03A	08	31	:10	L
JUN 15	166:14:19	1A-325	326	03A	08	31	:40	L
JUN 15	166:14:19	1A-326	326	03A	08	31	02:39	L
JUN 15	166:14:22	1A-327	326	03A	08	31	:02	S
JUN 15	166:14:22	1A-328	326	03A	08	31	:10	S
JUN 15	166:14:22	1A-329	326	03A	08	31	:40	S
JUN 15	166:14:23	1A-330	326	03A	08	31	:10	S
JUN 15	166:14:23	1A-331	326	03A	08	31	:40	S
JUN 15	166:14:24	1A-332	326	03A	08	31	02:39	S
JUN 15	166:14:27	1A-333	326	03A	08	31	:10	L
JUN 15	166:14:27	1A-334	326	03A	08	31	:40	L
JUN 15	166:14:28	1A-335	326	03A	08	31	02:39	L
JUN 15	166:14:33	1A-336	326	03A	08	31	:02	S
JUN 15	166:14:33	1A-337	326	03A	08	31	:10	S
JUN 15	166:14:34	1A-338	326	03A	08	31	:40	S
JUN 15	166:14:34	1A-339	326	03A	08	31	:05	L
JUN 15	166:14:34	1A-340	326	03A	08	31	:20	L
JUN 15	166:14:35	1A-341	326	03A	08	31	01:20	L
JUN 15	166:14:36	1A-342	326	03A	08	31	:02	S
JUN 15	166:14:36	1A-343	326	03A	08	31	:10	S
JUN 15	166:14:36	1A-344	326	03A	08	31	:40	S
JUN 15	166:14:37	1A-345	326	03A	08	31	:10	S
JUN 15	166:14:37	1A-346	326	03A	08	31	:40	S
JUN 15	166:14:38	1A-347	326	03A	08	31	:12	S
JUN 15	166:15:22	1A-348	327	03A	08	31	:10	S
JUN 15	166:15:32	1A-349	327	03A	08	31	:10	S
JUN 15	166:15:42	1A-350	327	03A	08	31	:09	S
JUN 15	166:15:53	1A-351	327	03A	08	31	:09	S
JUN 15	166:16:05	1A-352	327	03A	08	31	:10	S
JUN 15	166:16:55	1A-353	328	02A-1	04	37	:03	S
JUN 15	166:16:55	1A-354	328	02A-1	04	37	:10	S
JUN 15	166:16:55	1A-355	328	02A-1	04	37	:40	S

DATE	TIME	FILM-STRIP	D/N	JOP-ST	RR	TGT	EXP	WVL
JUN 15	166:18:29	1A-356	329	02A-7	10	37	1:19	L
JUN 15	166:18:50	1A-357	329	02A-6	7	37	00:05	L
JUN 15	166:20:15	1A-358	330	02A-7	10	41	:10	S
JUN 15	166:20:27	1A-359	330	02A-7	10	41	:02	S
JUN 15	166:20:33	1A-360	330	02A-7	10	41	:10	S
JUN 15	166:21:49	1A-361	331	06 -1	01	SC	:20	L
JUN 16	167:10:13	1A-362	339	06 -1	01	SC	:49	L
JUN 16	167:10:26	1A-363	339	06 -1	01	SC	:50	L
JUN 16	167:17:54	1A-364	344	02A-2	05	37	:05	L
JUN 16	167:17:54	1A-365	344	02A-2	05	37	:20	L
JUN 16	167:17:54	1A-366	344	02A-2	05	37	01:20	L
JUN 16	167:20:55	1A-367	346	06 -1	01A	SC	:10	L
JUN 16	167:21:04	1A-368	346	06 -1	01B	SC	:10	L
JUN 16	167:21:30	1A-369	346	OBS		UNK	09:06	S
JUN 17	168:09:32	1A-370	354	06 -1	01	SC	:49	L
JUN 17	168:12:44	1A-371	356	02F-3	10	41	:04	L
JUN 17	168:15:47	1A-372	358	02A-2	05	37	:05	L
JUN 17	168:15:48	1A-373	358	02A-2	05	37	:20	L
JUN 17	168:15:48	1A-374	358	02A-2	05	37	01:20	L
JUN 17	168:17:05	1A-375	359	02A-1	04	41	:10	S
JUN 17	168:17:05	1A-376	359	02A-1	04	41	:40	S
JUN 17	168:17:05	1A-377	359	02A-1	04	41	02:39	S
JUN 17	168:21:51	1A-378	362	06 -1	01	SC	:10	L
JUN 17	168:21:59	1A-379	362	06 -1	01	SC	:10	L
JUN 18	169:10:21	1A-380	370	06 -1	01	SC	:49	L
JUN 18	169:10:29	1A-381	370	06 -1	01	SC	:49	L
JUN 18	169:12:03	1A-382	371	04 -7	06	F82	:04	L
JUN 18	169:12:19	1A-383	371	04 -7	06	F84	:10	L
JUN 18	169:15:12	1A-384	373	02A-2	05	37	:02	S
JUN 18	169:15:12	1A-385	373	02A-2	05	37	:10	S
JUN 18	169:15:13	1A-386	373	02A-2	05	37	:40	S
JUN 18	169:16:22	1A-387	374	12C-1	16	QR1	:10	S
JUN 18	169:16:31	1A-388	374	12C-1	16	QR1	:10	S
JUN 18	169:21:05	1A-389	377	06 -1	01	SC	:10	L
JUN 18	169:21:33	1A-390	377	06 -1	01	SC	:10	L
JUN 18	169:21:38	1A-391	377	02A-7	10	37	01:16	L
JUN 18	169:21:40	1A-392	377	02A-7	10	37	01:19	L
JUN 18	169:21:45	1A-393	377	02A-7	10	37	:10	L
JUN 19	170:06:29	1A-394	383	UNA		WLR	:20	L

DATE	TIME	FILM-STRIP	D/N	JOP-ST	BB	TGT	EXP	WVL
JUN 19	170:06:30	1A-395	383	UNA		WLB	:10	S
JUN 19	170:06:30	1A-396	383	UNA		WLB	01:20	L
JUN 19	170:06:31	1A-397	383	UNA		WLB	:40	S
JUN 19	170:06:32	1A-398	383	UNA		WLB	05:19	L
JUN 19	170:06:37	1A-399	383	UNA		WLB	02:39	S

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 been incorporated into the computer tabulations.

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. 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.

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.

S082A EDB PRINTOUT INDEX
Page 3

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).

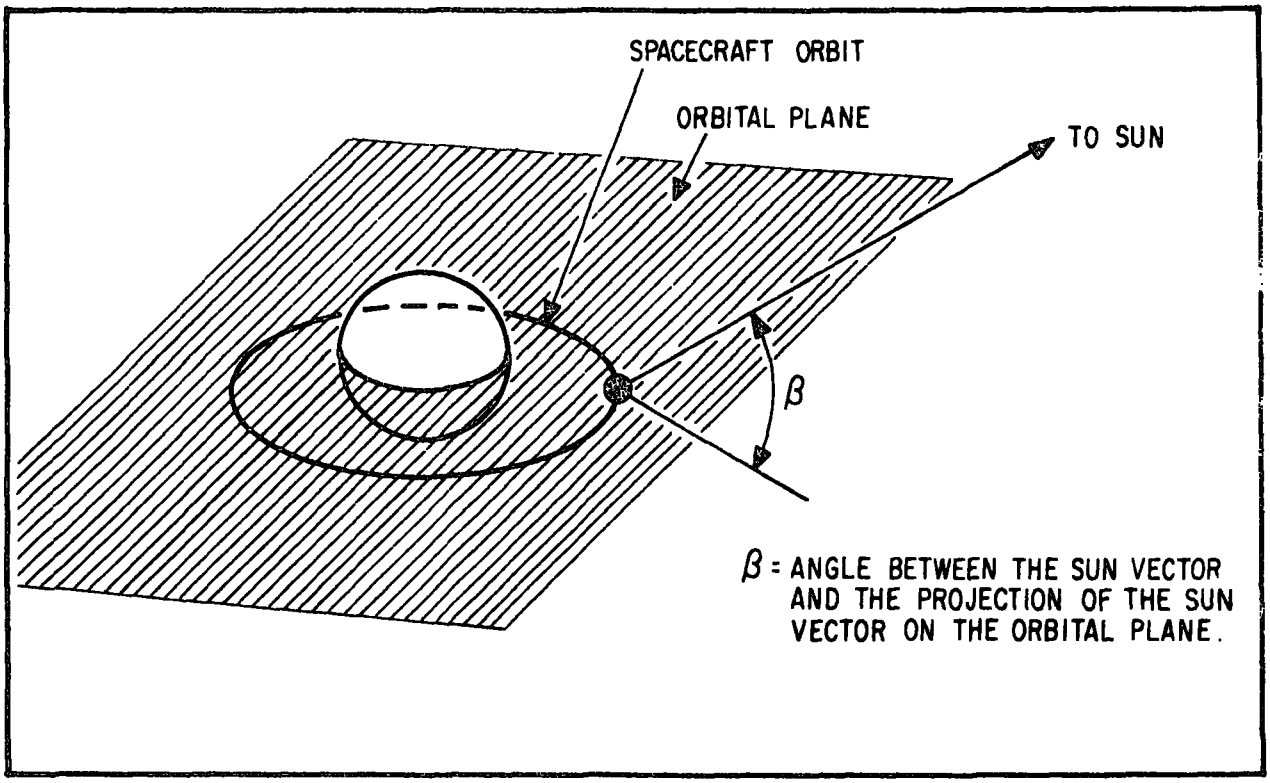

Figure 5-1 Beta Angle

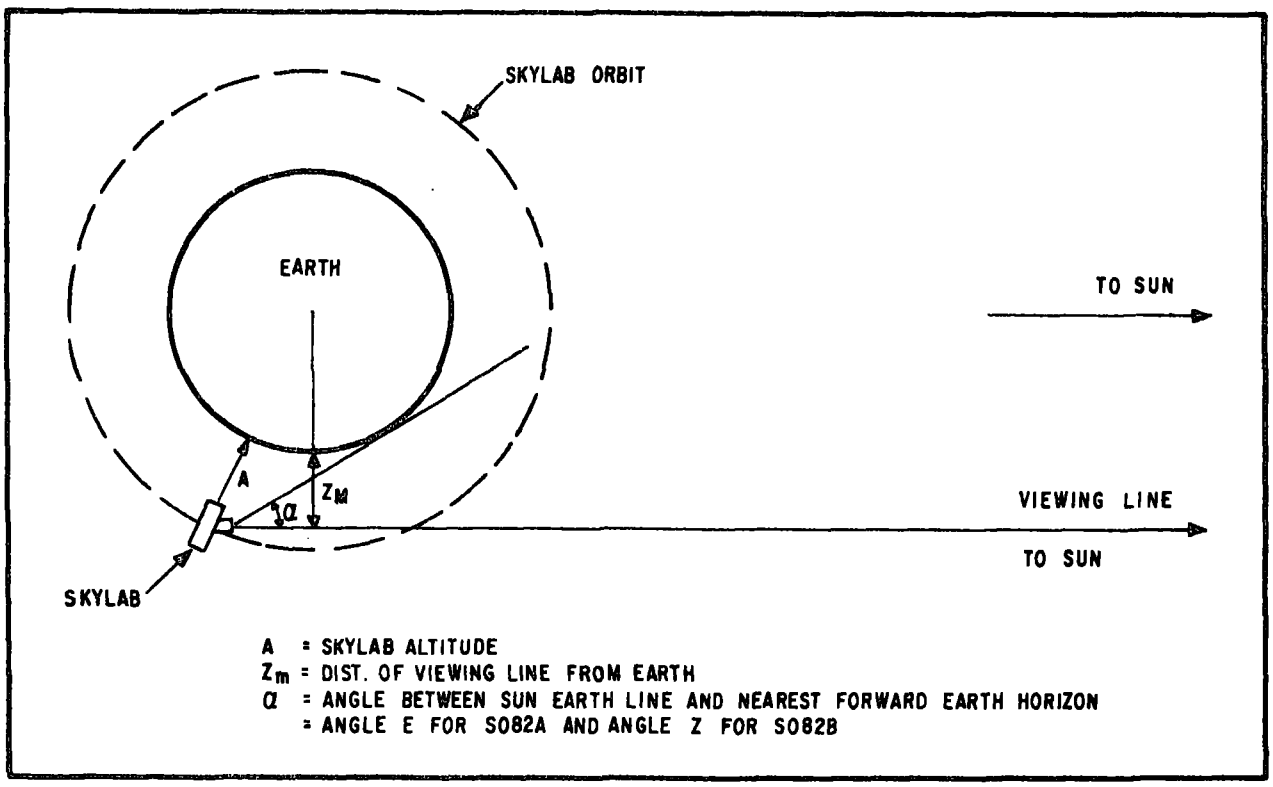

Figure 5-2 Extinction Parameters

5082A-EDB
INSTRUMENT OPERATION 6- 4-75 AT 0 HOURS 3 MINS 36 SECS
PAGE 1- 1

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)
158:18:39:37:957	39:42:707	0: 4:750	IA-201	L	L	1	MAN	X	X	5		X	X	X	OK	OK
159: 2:25:35:898	27:15:393	1:39:495	IA-202	L	L	1	MAN	X	4	5	MA	6	X	HI	OK	OK
160: 1:20:16:909	20:25:658	0: 8:749	IA-203	S	S	1	MAN	X	4	5	MA	6	X	HI	OK	OK
160: 1:27:22:142	27:31:642	0: 9:500	IA-204	S	S	1	MAN	X	4	5	G3	6	X	HI	OK	OK
160:13:33: 0:119	36:18:860	3:18:741	IA-205	L	L	1	MAN	X	4	5	GS	6	X	HI	OK	OK
160:13:43:28:838	46:47:827	3:18:989	IA-206	L	L	1	MAN	X	4	5	GS	6	X	HI	OK	OK
160:19:56:38:296	56:58:295	0:19:999	IA-207	L	L	1	AUTO 1	X	4	5	MA	6	B	HI	OK	OK
160:19:57: 0:295	58:19:791	1:19:496	IA-208	L	L	1	AUTO 1	X	4	5	MA	6	B	HI	OK	OK
160:19:58:21:791	3:40:526	5:18:735	IA-209	L	L	1	AUTO 1	X	4	5	MA	6	B	HI	OK	OK
160:21: 8:18: 34	8:28: 33	0: 9:999	IA-210	S	S	1	AUTO 1	X	4	5	MA	6	X	HI	OK	OK
160:21: 8:30: 33	9: 9:781	0:39:748	IA-211	S	S	1	AUTO 1	X	4	5	MA	6	X	HI	OK	OK
160:21: 9:11:781	11:51: 22	2:39:241	IA-212	S	S	1	AUTO 1	X	4	5	MA	6	X	HI	OK	OK
161: 0:17:18: 63	22:17:298	4:59:285	IA-213	L	L	1	MAN	X	4	5	MA	6	B	HI	OK	OK
161: 0:35:12:269	35:31:268	0:18:999	IA-214	L	L	1	MAN	X	4	5	MA	6	B	HI	OK	OK
161: 1:46:27:574	47: 7: 72	0:39:498	IA-215	S	S	1	MAN	X	4	5		6	X	HI	OK	OK
161:16: 1:45:929	5: 5:170	3:19:241	IA-216	L	L	1	MAN	X	4	5	MA	6	X	HI	OK	OK
161:16:10:47:402	14: 6:142	3:18:740	IA-217	L	L	1	MAN	X	4	5	GS	6	X	HI	OK	OK
161:17:21:10:781	21:20:780	0: 9:999	IA-218	S	S	1	AUTO 1	X	X	5	MA	6	X	HI	OK	OK
161:17:21:22:780	22: 2:528	0:39:748	IA-219	S	S	1	AUTO 1	X	4	5	MA	6	B	HI	OK	OK
161:17:22: 4:528	24:43:770	2:39:242	IA-220	S	S	1	AUTO 1	X	4	5	MA	6	B	HI	OK	OK

S082A-EDB
INSTRUMENT OPERATION 6- 4-75 AT 0 HOURS 3 MINS 36 SECS
PAGE 2- 1

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)
1A-201	5196.87				16.25	45.00	457.81	-331.05	450.45	418.90	348
		.000	.000	.000	16.25	45.00					
1A-202	-10241.00				16.25	45.00	543.00	-295.34	450.50	425.30	352
		.000	.000	.000	16.25	45.00					
1A-203	10577.00				16.25	45.00	798.12	4591.64	440.52	-2547.31	366
		.000	.000	.000	16.25	45.00					
1A-204	-5581.00				16.25	45.00	798.37	3471.23	442.88	-937.29	366
		.000	.000	.000	16.25	45.00					
1A-205	10743.77				16.25	45.00	936.72	2468.62	440.20	10.81	374
		.000	.000	.000	16.25	45.00					
1A-206	-5395.28				16.25	45.00	938.15	4343.14	440.11	-2151.03	374
		.000	.000	.000	16.25	45.00					
1A-207	-9761.61				20.00	55.00	1008.84	4290.68	440.09	-2069.93	377
		.000	.000	.000	20.00	55.00					
1A-208	-9761.28				20.00	55.00	1008.88	4366.05	440.18	-2186.58	377
		.000	.000	.000	20.00	55.00					
1A-209	-9761.61				20.00	55.00	1008.92	4393.99	440.32	-2230.05	377
		.000	.000	.000	20.00	55.00					
1A-210	9843.00				20.00	55.00	1021.51	78.21	435.27	52.86	378
		.000	.000	.000	20.00	55.00					
1A-211	9843.00				20.00	55.00	1021.51	122.47	435.27	81.30	378
		.000	.000	.000	20.00	55.00					
1A-212	9843.00				20.00	55.00	1021.85	276.44	436.03	172.04	378
		.000	.000	.000	20.00	55.00					
1A-213	10715.00				20.00	55.00	1062.00	4173.00	440.10	-1891.00	380
		.000	.000	.000	20.00	55.00					
1A-214	10719.00				20.00	55.00	1062.00	4173.00	440.10	-1891.00	380
		.000	.000	.000	20.00	55.00					
1A-215	-10678.00				20.00	55.00	1074.00	-255.40	433.90	415.11	381
		.000	.000	.000	20.00	55.00					
1A-216	-10649.00				20.00	55.00	1239.49	3023.65	439.71	-456.15	389
		.000	.000	.000	20.00	55.00					
1A-217	-5398.00				20.00	55.00	1240.29	4162.11	440.40	-1874.53	390
		.000	.000	.000	20.00	55.00					
1A-218	-9923.00				20.00	55.00	1253.61	247.28	435.87	155.84	390
		.000	.000	.000	20.00	55.00					
1A-219	-9922.00				20.00	55.00	1253.61	247.28	435.87	155.84	390
		.000	.000	.000	20.00	55.00					
1A-220	-9922.00				20.00	55.00	1253.97	463.30	436.53	264.60	390
		.000	.000	.000	20.00	55.00					

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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)	OP EXP (J)	(K)	(L)	(M)	(N)	(O)	TEMP OP (P)	TEMP CL (Q)
161:18:59:47:900			IA-221	S	S	I	MAN	X	4	5	G3	6	B	HI	OK	
	4:47:676	4:59:100														OK
161:19:15:51:644			IA-222	S	S	I	MAN	X	4	5	G3	6	B	HI	OK	
	17:30:639	1:38:995														OK
161:20:23:55: 83			IA-223	L	L	I	MAN	X	4	5	GS	6	B	HI	OK	
	24:14:332	0:19:249														OK
161:20:33:24:803			IA-224	L	L	I	MAN	X	4	5	GS	6	B	HI	OK	
	34:44:299	1:19:496														OK
161:20:50:16:624			IA-225	S	S	I	MAN	X	4	5	GS	6	B	HI	OK	
	50:26:374	0: 9:750														OK
161:21:58:33: 50			IA-226	S	S	I	MAN	X	4	5		X	B	HI	OK	
	59:12:300	0:39:250														OK
161:22:26:53:682			IA-227	L	L	I	MAN	X	4	5		6	B	HI	OK	
	27:12:931	0:19:249														OK
162: 1:10: 0:140			IA-228	S	S	I	MAN	X	4	5	GS	6	X	HI	OK	
	10: 9:390	0: 9:250														OK
162: 1:19:25:111			IA-229	S	S	I	MAN	X	4	5	G3	6	X	HI	OK	
	19:35:111	0:10: 0														OK
162: 1:40:43:470			IA-230	L	L	I	MAN	X	4	5	MA	6	B	HI	OK	
	42: 2:716	1:19:246														OK
162:13:42:31:560			IA-231	L	L	I	MAN	X	4	5	MA	6	X	HI	OK	
	45:50:800	3:19:240														OK
162:13:52:16: 30			IA-232	L	L	I	MAN	X	4	5	G3	6	X	HI	OK	
	55:35:770	3:19:740														OK
162:18:10:16:206			IA-233	S	S	I	MAN	X	4	5	MA	6	X	HI	OK	
	10:25:956	0: 9:750														OK
162:18:30:53: 0			IA-234	X	X	I	AUTO I	X	4	5	MA	6	B	HI	OK	
	30:53: 0	0: 0: 0														OK
162:18:30:55:178			IA-235	L	L	I	AUTO I	X	4	5	MA	6	B	HI	OK	
	32:14:924	1:19:746														OK
162:18:32:16:924			IA-236	L	L	I	AUTO I	X	4	5	MA	6	B	HI	OK	
	37:35:408	5:18:484														OK
162:19:45: 5:977			IA-237	L	L	I	MAN	X	4	5	M3	6	B	HI	OK	
	34: 4:163	48:58:166														OK
162:21:26:27:419			IA-238	S	S	I	MAN	X	4	5	GS	6	B	HI	OK	
	27:46:666	1:19:247														OK
162:21:40:33:224			IA-239	S	S	I	MAN	X	4	5	GS	6	B	HI	OK	
	43:12:719	2:39:495														OK
163: 0:26:59:516			IA-240	S	S	I	MAN	X	4	5	MA	6	B	HI	OK	
	27: 9:516	0:10: 0														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)
1A-221	$-10^{4}34.00$				20.00	55.00	1272.92	1076.17	438.02	430.36	391
		.000	.000	.000	20.00	55.00					
1A-222	$-10^{4}29.01$				20.00	55.00	1276.17	4087.41	440.09	-1765.18	391
		.000	.000	.000	20.00	55.00					
1A-223	$-10^{3}62.00$				20.00	55.00	1288.05	-514.00	432.39	356.42	392
		.000	.000	.000	20.00	55.00					
1A-224	$-10^{3}63.00$				20.00	55.00	1291.48	1434.28	438.67	427.79	392
		.000	.000	.000	20.00	55.00					
1A-225	$-10^{3}64.42$				20.00	55.00	1294.21	4105.26	440.50	-1790.23	392
		.000	.000	.000	20.00	55.00					
1A-226	$-10^{2}38.00$				20.00	55.00	1306.40	-210.68	434.50	421.70	393
		.000	.000	.000	20.00	55.00					
1A-227	$-9^{9}38.59$				20.00	55.00	1312.00	3908.48	441.51	-1506.59	393
		.000	.000	.000	20.00	55.00					
1A-228	$10^{7}99.00$				20.00	55.00	1344.17	859.81	437.71	396.35	395
		.000	.000	.000	20.00	55.00					
1A-229	$-5^{3}99.57$				20.00	55.00	1346.71	2716.46	439.60	-178.53	395
		.000	.000	.000	20.00	55.00					
1A-230	$-6^{3}81.40$				20.00	55.00	1348.42	2634.77	446.44	-99.50	395
		.000	.000	.000	20.00	55.00					
1A-231	$10^{7}63.87$				20.00	55.00	1492.00	3757.00	439.60	-1306.00	403
		.000	.000	.000	20.00	55.00					
1A-232	$-5^{3}69.25$				20.00	55.00	1491.90	3757.35	439.62	-1306.31	403
		.000	.000	.000	20.00	55.00					
1A-233	$-5^{3}59.00$				20.00	55.00	1541.08	-243.64	434.14	417.00	405
		.000	.000	.000	20.00	55.00					
1A-234	$-9^{9}08.00$				20.00	55.00	1546.00	3525.00	439.50	-2841.00	405
		.000	.000	.000	20.00	55.00					
1A-235	$-9^{9}08.00$				20.00	55.00	1546.28	3524.67	439.46	-1010.14	405
		.000	.000	.000	20.00	55.00					
1A-236	$-9^{9}07.00$				20.00	55.00	1546.42	3737.09	439.76	-1279.19	405
		.000	.000	.000	20.00	55.00					
1A-237	$-10^{1}07.00$				20.00	55.00	1559.88	90.92	435.40	61.15	406
		.000	.000	.000	20.00	55.00					
1A-238	$10^{7}03.23$				20.00	55.00	1580.59	1664.09	438.77	387.00	407
		.000	.000	.000	20.00	55.00					
1A-239	$10^{7}05.20$				20.00	55.00	1582.73	3796.39	440.04	-1357.31	407
		.000	.000	.000	20.00	55.00					
1A-240	$10^{7}59.00$				20.00	55.00	1614.69	547.63	436.31	299.81	409
		.000	.000	.000	20.00	55.00					

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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)
163: 1: 2:17:908	2:57:156	0:39:248	IA-241	S	S	1	MAN	X	4	5	MA	6	B	HI	OK	OK
163: 1:56:10:770	59:30: 10	3:19:240	IA-242	L	L	1	MAN	X	4	5	MA	6	X	HI	OK	OK
163:14:32:15:250	35:34: 0	3:18:750	IA-243	L	L	1	MAN	X	4	5	GS	6	X	HI	OK	OK
163:14:45: 4:129	48:22:869	3:18:740	IA-244	L	L	1	MAN	X	4	5	GS	6	X	HI	OK	OK
163:16: 2:15:161	7:13:904	4:58:743	IA-245	L	L	1	MAN	X	4	5	GS	6	B	HI	OK	OK
163:16:20:15:114	21:54:859	1:39:745	IA-246	S	S	1	MAN	X	4	5	GS	6	B	HI	OK	OK
163:17:32: 6:406	32:16:656	0:10:250	IA-247	S	S	1	MAN	X	4	5	GS	6	B	HI	OK	OK
163:17:49:16:125	49:36:623	0:20:498	IA-248	L	L	1	MAN	X	4	5	MA	6	B	HI	OK	OK
163:18: 1:26:587	2:45:583	1:18:996	IA-249	S	S	1	MAN	X	4	5	GS	6	B	HI	OK	OK
163:19:16:43:378	17: 2:377	0:18:999	IA-250	S	S	1	MAN	X	4	5	MA	6	B	HI	OK	OK
163:19:30:14:297	32:43:297	2:29: 0	IA-251	L	L	1	MAN	X	4	5	MA	6	B	HI	OK	OK
163:20:35:37:901	35:57:150	0:19:249	IA-252	L	L	1	MAN	X	4	5	GS	6	B	HI	OK	OK
163:20:53:36:364	58:35: 97	4:58:733	IA-253	L	L	1	MAN	X	4	5	GS	6	B	HI	OK	OK
163:21: 2: 4:958	3:44:208	1:39:250	IA-254	L	L	1	MAN	X	4	5	GS	6	B	HI	OK	OK
163:21:25: 7:275	25:17:274	0: 9:999	IA-255	S	S	1	MAN	X	X	5	ML	6	X	HI	OK	OK
163:21:25:22:274	25:32:274	0:10: 0	IA-256	S	S	1	MAN	X	X	5	ML	6	X	HI	OK	OK
163:21:25:37:272	25:47:272	0:10: 0	IA-257	S	S	1	MAN	X	4	5	ML	6	X	HI	OK	OK
163:21:25:52:272	26: 2:270	0: 9:998	IA-258	S	S	1	MAN	X	4	5	ML	6	X	HI	OK	OK
163:22: 9:53:653	10: 3:652	0: 9:999	IA-259	S	S	1	AUTO 1	X	4	5	GS	6	X	HI	OK	OK
163:22:10: 5:652	10:45:400	0:39:748	IA-260	S	S	1	AUTO 1	X	4	5	GS	6	X	HI	OK	OK

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FRAME COUNT	GAMRR (ARCMINS)	MAX PT EXC (ARCSEC) GAMX	MAX PT EXC (ARCSEC) GAMY	MAX PT EXC (ARCMINS) GAMRR	NRL BIAS (ARCSEC) GXB1	NRL BIAS (ARCSEC) GYB1	ANGLE (ARCMINS) -B- OPEN	ANGLE (ARCMINS) -E- OPEN	ALTITUDE (KM)	Z(M) (KM)	ORBIT NUMBER
(D)	(R)	(S)	(T)	(U)			(V)	(W)	(X)	(Y)	(Z)
1A-241	9507.50				20.00	55.00	1620.41	1823.41	450.04	356.96	409
		.000	.000	.000	20.00	55.00					
1A-242	-10714.00				20.00	55.00	1631.69	-283.94	434.20	410.98	410
		.000	.000	.000	20.00	55.00					
1A-243	10670.00				20.00	55.00	1783.00	3581.00	439.90	-1079.00	418
		.000	.000	.000	20.00	55.00					
1A-244	-5418.68				20.00	55.00	1782.72	3580.95	439.86	-1078.71	418
		.000	.000	.000	20.00	55.00					
1A-245	-10287.00				20.00	55.00	1798.08	1129.63	437.74	434.31	418
		.000	.000	.000	20.00	55.00					
1A-246	-9598.00				20.00	55.00	1801.02	3599.97	440.51	-1100.93	418
		.000	.000	.000	20.00	55.00					
1A-247	-5287.00				20.00	55.00	1815.27	459.25	436.49	262.79	419
		.000	.000	.000	20.00	55.00					
1A-248	10025.00				20.00	55.00	1819.12	3368.06	439.19	-824.96	419
		.000	.000	.000	20.00	55.00					
1A-249	10025.00				20.00	55.00	1819.75	2884.14	445.69	-311.43	419
		.000	.000	.000	20.00	55.00					
1A-250	-9486.00				20.00	55.00	1836.68	2476.48	438.63	2.40	420
		.000	.000	.000	20.00	55.00					
1A-251	-9486.00				20.00	55.00	1837.87	3179.47	443.96	-605.73	420
		.000	.000	.000	20.00	55.00					
1A-252	-9477.00				20.00	55.00	1850.64	-124.50	434.45	429.93	421
		.000	.000	.000	20.00	55.00					
1A-253	-9475.86				20.00	55.00	1855.50	3049.23	438.78	-483.51	421
		.000	.000	.000	20.00	55.00					
1A-254	-9476.00				20.00	55.00	1855.80	3461.29	439.52	-933.44	421
		.000	.000	.000	20.00	55.00					
1A-255	-3479.41				20.00	55.00	1860.96	-431.56	451.81	398.04	422
		.000	.000	.000	20.00	55.00					
1A-256	-3479.41				20.00	55.00	1860.96	-480.71	451.81	385.14	422
		.000	.000	.000	20.00	55.00					
1A-257	-3479.74				20.00	55.00	1860.96	-529.86	451.81	370.82	422
		.000	.000	.000	20.00	55.00					
1A-258	-3479.74				20.00	55.00	1860.96	-579.01	451.81	355.16	422
		.000	.000	.000	20.00	55.00					
1A-259	-2573.00				20.00	55.00	1869.18	81.08	435.04	54.72	422
		.000	.000	.000	20.00	55.00					
1A-260	-2573.00				20.00	55.00	1869.53	120.67	435.64	80.20	422
		.000	.000	.000	20.00	55.00					

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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)	(I)	OP EXP (J)	(K)	(L)	(M)	(N)	(O)	TEMP OP (P)	TEMP CL (Q)
163:22:10:47:400			IA-261	S	S	1	AUTO	1	X	4	5	GS	6	X	HI	OK
	13:26:641	2:39:241														OK
164: 1:19:32:891			IA-262	L	L	1	MAN		X	4	5	MA	6	X	HI	OK
	20:32:638	0:59:747														OK
164: 1:28: 7:365			IA-263	L	L	1	MAN		X	X	5	G3	6	X	HI	OK
	29: 6:612	0:59:247														OK
164:15:37:21:989			IA-264	L	L	1	MAN		X	4	5	MA	6	X	HI	OK
	40:40:978	3:18:989														OK
164:15:45:10:215			IA-265	L	L	1	MAN		X	4	5	G3	6	X	HI	OK
	48:29:961	3:19:746														OK
164:18:19:31:428			IA-266	L	L	1	AUTO	2	X	4	5	MA	6	B	HI	OK
	19:51:427	0:19:999														OK
164:18:19:53:427			IA-267	S	S	1	AUTO	2	X	4	5	MA	6	B	HI	OK
	20: 3:426	0: 9:999														OK
164:18:20: 5:176			IA-268	L	L	1	AUTO	2	X	4	5	MA	6	B	HI	OK
	21:24:922	1:19:746														OK
164:18:21:26:922			IA-269	S	S	1	AUTO	2	X	4	5	MA	6	B	HI	OK
	22: 6:670	0:39:748														OK
164:18:22: 8:670			IA-270	L	L	1	AUTO	2	X	4	5	MA	6	B	HI	OK
	27:27:154	5:18:484														OK
164:18:27:29:154			IA-271	S	S	1	AUTO	2	X	4	5	MA	6	X	HI	OK
	30: 8:395	2:39:241														OK
164:19:55:37:165			IA-272	L	L	4	AUTO	1	X	4	5	M3	6	B	HI	OK
	56:56:911	1:19:746														OK
164:19:56:58:910			IA-273	L	L	4	AUTO	1	X	4	5	M3	6	B	HI	OK
	2:17:393	5:18:483														OK
164:20: 2:19:393			IA-274	L	L	4	AUTO	1	X	X	5	M3	6	B	HI	OK
	23:33:700	21:14:307														OK
164:23: 0:12:132			IA-275	S	S	1	MAN		X	4	5	GS	6	B	HI	OK
	0:21:631	0: 9:499														OK
165: 0:31:42: 9			IA-276	L	L	1	MAN		X	4	5	GS	6	B	HI	OK
	32: 1:508	0:19:499														OK
165: 0:58:56:189			IA-277	L	L	1	MAN		X	4	5	MA	6	X	HI	OK
	0:35:436	1:39:247														OK
165: 1: 6:27:417			IA-278	L	L	1	MAN		X	4	5	G3	6	X	HI	OK
	8: 6:412	1:38:995														OK
165: 6:52: 0: 40			IA-279	L	L	1	AUTO	2	X	4	5	MA	X	X	X	OK
	52:19:956	0:19:916														OK
165: 6:52:21:956			IA-280	S	S	1	AUTO	2	X	4	5	MA	X	X	X	OK
	52:31:955	0: 9:999														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)
1A-261	-2573.00				20.00	55.00	1869.53	258.35	435.64	161.98	422
		.000	.000	.000	20.00	55.00					
1A-262	-10763.00				20.00	55.00	1906.93	708.61	436.87	356.35	424
		.000	.000	.000	20.00	55.00					
1A-263	-5403.52				20.00	55.00	1909.51	2285.28	438.49	125.68	424
		.000	.000	.000	20.00	55.00					
1A-264	-10767.50				20.00	55.00	2075.28	3306.91	439.97	-753.69	432
		.000	.000	.000	20.00	55.00					
1A-265	-5409.79				20.00	55.00	2075.68	2863.75	445.39	-293.61	433
		.000	.000	.000	20.00	55.00					
1A-266	-7687.00				20.00	55.00	2106.50	-360.72	433.82	396.34	434
		.000	.000	.000	20.00	55.00					
1A-267	-7687.00				20.00	55.00	2106.50	-291.47	433.82	409.33	434
		.000	.000	.000	20.00	55.00					
1A-268	-7687.00				20.00	55.00	2106.85	-254.46	434.46	415.84	434
		.000	.000	.000	20.00	55.00					
1A-269	-7686.00				20.00	55.00	2107.21	3.34	435.05	2.33	434
		.000	.000	.000	20.00	55.00					
1A-270	-7686.00				20.00	55.00	2107.57	135.01	435.59	89.20	434
		.000	.000	.000	20.00	55.00					
1A-271	-7685.00				20.00	55.00	2109.30	1134.39	437.39	434.28	434
		.000	.000	.000	20.00	55.00					
1A-272	8759.00				20.00	55.00	2125.86	180.99	435.45	117.28	435
		.000	.000	.000	20.00	55.00					
1A-273	8759.00				20.00	55.00	2126.22	437.28	435.93	252.69	435
		.000	.000	.000	20.00	55.00					
1A-274	8760.33				20.00	55.00	2128.21	1363.51	437.66	433.16	435
		.000	.000	.000	20.00	55.00					
1A-275	8706.00				20.00	55.00	2161.91	-170.76	434.68	426.29	437
		.000	.000	.000	20.00	55.00					
1A-276	8735.00				20.00	55.00	2174.66	-.17	442.30	442.30	438
		.000	.000	.000	20.00	55.00					
1A-277	10796.50				20.00	55.00	2185.24	3213.61	440.95	-648.96	438
		.000	.000	.000	20.00	55.00					
1A-278	-5411.43				20.00	55.00	2185.77	2571.36	447.14	-49.90	438
		.000	.000	.000	20.00	55.00					
1A-279	6215.00				20.00	55.00	2255.72	863.53	437.11	396.73	442
		.000	.000	.000	20.00	55.00					
1A-280	6215.00				20.00	55.00	2255.72	928.86	437.11	409.59	442
		.000	.000	.000	20.00	55.00					

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INSTRUMENT OPERATION 6- 4-75 AT 0 HOURS 3 MINS 36 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)
165: 6:52:33:955			IA-281	L	L	1	AUTO 2	X	4	5	MA	X	X	X	OK	
	53:53:450	1:19:495														OK
165: 6:53:55:450			IA-282	S	S	1	AUTO 2	X	4	5	MA	X	X	X	OK	
	54:35:198	0:39:748														OK
165: 6:54:37:198			IA-283	L	L	1	AUTO 2	X	4	5	MA	X	X	X	OK	
	59:55:935	5:18:737														OK
165: 6:59:57:685			IA-284	S	S	1	AUTO 2	X	4	5	MA	X	X	X	OK	
	2:37:177	2:39:492														OK
165:13:22:19:624			IA-285	L	L	1	MAN	X	X	5	MA	6	X	HI	OK	
	25:39:114	3:19:490														OK
165:13:39:37:993			IA-286	L	L	1	MAN	X	4	5	G3	6	X	HI	OK	
	42:56:983	3:18:990														OK
165:17:40:29:346			IA-287	L	L	1	MAN	X	4	5	ML	6	B	HI	OK	
	40:49:845	0:20:499														OK
165:17:48:12:636			IA-288	L	L	1	MAN	X	4	5	ML	6	X	HI	OK	
	49:32:382	1:19:746														OK
165:19: 9:22:894			IA-289	S	S	1	AUTO 1	X	X	5		6	X	HI	OK	
	9:32:894	0:10: 0														OK
165:19: 9:34:894			IA-290	S	S	1	AUTO 1	X	4	5	MA	6	X	HI	OK	
	10:14:642	0:39:748														OK
165:19:10:16:642			IA-291	S	S	1	AUTO 1	X	4	5	MA	6	X	HI	OK	
	12:55:883	2:39:241														OK
165:19:48:58:507			IA-292	L	L	1	MAN	X	4	5	MA	6	X	HI	OK	
	54:17:992	5:19:485														OK
165:20:44:35:891			IA-293	S	S	1	AUTO 1	X	X	5	MA	6	X	HI	OK	
	44:45:891	0:10: 0														OK
165:20:44:47:641			IA-294	S	S	1	AUTO 1	X	4	5	MA	6	X	HI	OK	
	45:27:639	0:39:998														OK
165:20:45:29:639			IA-295	S	S	1	AUTO 1	X	4	5	MA	6	X	HI	OK	
	48: 8:880	2:39:241														OK
165:21:22: 6:950			IA-296	L	L	1	AUTO 1	X	4	5	GS	6	B	HI	OK	
	22:26:949	0:19:999														OK
165:21:22:28:949			IA-297	L	L	1	AUTO 1	X	4	5	GS	6	B	HI	OK	
	23:48:694	1:19:745														OK
165:21:23:50:444			IA-298	L	L	1	AUTO 1	X	4	5	GS	6	B	HI	OK	
	27:25:932	3:35:488														OK
165:22:16:43:381			IA-299	L	L	1	MAN	X	4	5	GS	6	B	HI	OK	
	17: 3:380	0:19:999														OK
* 165:23:51: 2:367			IA-300	L	L	1	MAN	X	4	5	MA	6	X	HI	OK	
	51:51:365	0:48:998														OK

Note: See frame IA402 for next exposure.

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)
1A-281	$6^{2}16.00$				20.00	55.00	2255.72	964.62	437.11	415.58	442
		.000	.000	.000	20.00	55.00					
1A-282	$6^{2}16.00$				20.00	55.00	2256.04	1205.72	437.32	437.02	442
		.000	.000	.000	20.00	55.00					
1A-283	$6^{2}16.61$				20.00	55.00	2256.35	1327.28	437.49	435.21	442
		.000	.000	.000	20.00	55.00					
1A-284	$6^{2}18.58$				20.00	55.00	2257.60	2055.86	437.89	246.36	442
		.000	.000	.000	20.00	55.00					
1A-285	$-10^{7}95.18$				20.00	55.00	2331.77	3047.18	440.08	-478.62	446
		.000	.000	.000	20.00	55.00					
1A-286	$-5^{4}04.18$				20.00	55.00	2333.84	1380.52	452.99	448.72	446
		.000	.000	.000	20.00	55.00					
1A-287	$10^{3}03.00$				20.00	55.00	2382.42	109.80	435.16	73.26	448
		.000	.000	.000	20.00	55.00					
1A-288	$10^{3}06.00$				20.00	55.00	2385.04	1415.01	437.29	428.27	448
		.000	.000	.000	20.00	55.00					
1A-289	$-5^{1}32.00$				20.00	55.00	2399.30	-657.04	432.68	308.70	449
		.000	.000	.000	20.00	55.00					
1A-290	$-5^{1}32.00$				20.00	55.00	2399.30	-622.00	432.68	321.52	449
		.000	.000	.000	20.00	55.00					
1A-291	$-5^{1}32.00$				20.00	55.00	2399.64	-499.81	433.34	361.44	449
		.000	.000	.000	20.00	55.00					
1A-292	$-10^{7}99.47$				20.00	55.00	2406.38	1973.23	450.91	302.92	449
		.000	.000	.000	20.00	55.00					
1A-293	$10^{7}93.00$				20.00	55.00	2418.25	-306.25	433.79	406.80	450
		.000	.000	.000	20.00	55.00					
1A-294	$10^{7}93.00$				20.00	55.00	2418.25	-271.79	433.79	412.52	450
		.000	.000	.000	20.00	55.00					
1A-295	$10^{7}93.00$				20.00	55.00	2418.61	-148.45	434.36	428.05	450
		.000	.000	.000	20.00	55.00					
1A-296	$-10^{6}38.30$				20.00	55.00	2424.78	1848.58	451.46	350.59	450
		.000	.000	.000	20.00	55.00					
1A-297	$-10^{6}38.30$				20.00	55.00	2424.78	1848.58	451.46	350.59	450
		.000	.000	.000	20.00	55.00					
1A-298	$-10^{6}38.30$				20.00	55.00	2425.00	1694.78	452.15	397.07	450
		.000	.000	.000	20.00	55.00					
1A-299	$-10^{3}92.00$				20.00	55.00	2436.05	-498.10	433.19	361.83	451
		.000	.000	.000	20.00	55.00					
* 1A-300	$-10^{5}74.00$				20.00	55.00	2454.94	-307.14	434.28	407.14	452
		.000	.000	.000	20.00	55.00					

Note: See frame 1A 402 for next exposure.

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INSTRUMENT OPERATION 6- 4-75 AT 0 HOURS 3 MINS 36 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)
166: 5: 6:24:510			IA-301	L	L	1	AUTO 2	X	4	5	MA	X	X	X	OK	
	6:44:424	0:19:914														OK
166: 5: 6:46:341			IA-302	S	S	1	AUTO 2	X	4	5	MA	X	X	X	OK	
	6:56:258	0: 9:917														OK
166: 5: 6:58:258			IA-303	L	L	1	AUTO 2	X	4	5	MA	X	X	X	OK	
	8:17:920	1:19:662														OK
166: 5: 8:19:837			IA-304	S	S	1	AUTO 2	X	4	5	MA	X	X	X	OK	
	8:59:751	0:39:914														OK
166: 5: 9: 1:751			IA-305	S	S	1	AUTO 2	X	4	5	MA	X	X	X	OK	
	11:40:994	2:39:243														OK
166: 5:11:42:992			IA-306	L	L	1	AUTO 2	X	X	5	MA	X	X	X	OK	
	17: 1:479	5:18:487														OK
166:10:56:51: 39			IA-307	L	L	1	MAN	X	4	5	MA	6	X	HI	OK	
	0:10:779	3:19:740														OK
166:11: 4:36:515			IA-308	L	L	1	MAN	X	4	5	G3	6	X	HI	OK	
	7:55:761	3:19:246														OK
166:12:18:45:814			IA-309	L	L	1	MAN	X	4	5	MA	6	B	HI	OK	
	19: 5:896	0:20: 82														OK
166:12:59:48:692			IA-310	S	S	1	MAN	X	X	5		6	X	HI	OK	
	59:50:192	0: 1:500														OK
166:13:52:38: 53			IA-311	L	L	1	MAN	X	4	5	MA	6	B	HI	OK	
	53:57: 52	1:18:999														OK
166:14:11:37:753			IA-312	S	S	1	FLARE	X	4	5	GS	6	B	HI	OK	
	11:40:253	0: 2:500														OK
166:14:11:42:252			IA-313	S	S	1	FLARE	X	4	5	GS	6	B	HI	OK	
	11:52:252	0:10: 0														OK
166:14:11:54:252			IA-314	S	S	1	FLARE	X	4	5	GS	6	B	HI	OK	
	12:34: 0	0:39:748														OK
166:14:12:36: 0			IA-315	L	L	1	FLARE	X	4	5	ML	6	B	HI	OK	
	12:40:999	0: 4:999														OK
166:14:12:42:999			IA-316	L	L	1	FLARE	X	4	5	ML	6	B	HI	OK	
	13: 2:748	0:19:749														OK
166:14:13: 4:748			IA-317	L	L	1	FLARE	X	4	5	ML	6	B	HI	OK	
	14:24:494	1:19:746														OK
166:14:14:26:244			IA-318	S	S	1	FLARE	X	4	5	ML	6	B	HI	OK	
	14:28:744	0: 2:500														OK
166:14:14:30:744			IA-319	S	S	1	FLARE	X	4	5	ML	6	B	HI	OK	
	14:40:743	0: 9:999														OK
166:14:14:42:743			IA-320	S	S	1	FLARE	X	4	5	ML	6	B	HI	OK	
	15:22:491	0:39:748														OK

FRAME COUNT	GAMRR (ARCMINS)	MAX PT EXC (ARCSEC)		(ARCMINS)	--NRL BIAS-- (ARCSEC)		ANGLE (ARCMINS)		ALTITUDE (KM)	Z(M) (KM)	ORBIT NUMBER
		GAMX	GAMY	GAMRR	GXBI	GYBI	-B- OPEN	-E- OPEN			
(D)	(R)	(S)	(T)	(U)			(V)	(W)	(X)	(Y)	(Z)
1A-301	$10^{7}19.00$				20.00	55.00	2515.90	2105.12	449.93	242.20	455
		.000	.000	.000	20.00	55.00					
1A-302	$10^{7}19.00$				20.00	55.00	2515.90	2105.12	449.93	242.20	455
		.000	.000	.000	20.00	55.00					
1A-303	$10^{7}19.00$				20.00	55.00	2515.90	2105.12	449.93	242.20	455
		.000	.000	.000	20.00	55.00					
1A-304	$10^{7}20.00$				20.00	55.00	2516.29	1825.47	451.53	358.39	455
		.000	.000	.000	20.00	55.00					
1A-305	$10^{7}20.00$				20.00	55.00	2516.52	1677.15	452.23	401.52	455
		.000	.000	.000	20.00	55.00					
1A-306	$10^{7}21.00$				20.00	55.00	2517.04	1367.32	453.36	450.00	455
		.000	.000	.000	20.00	55.00					
1A-307	$-10^{7}59.26$				20.00	55.00	2586.96	1707.97	437.09	373.47	459
		.000	.000	.000	20.00	55.00					
1A-308	$5^{4}18.68$				20.00	55.00	2587.97	2631.24	438.62	-112.05	459
		.000	.000	.000	20.00	55.00					
1A-309	$-8^{0}95.00$				20.00	55.00	2602.10	24.40	435.20	435.00	459
		.000	.000	.000	20.00	55.00					
1A-310	$-9^{4}06.32$				20.00	55.00	2608.95	915.10	454.20	419.73	460
		.000	.000	.000	20.00	55.00					
1A-311	$-10^{2}36.00$				20.00	55.00	2620.31	121.69	435.19	80.80	460
		.000	.000	.000	20.00	55.00					
1A-312	$-10^{2}27.31$				20.00	55.00	2624.46	2634.71	438.93	-114.14	461
		.000	.000	.000	20.00	55.00					
1A-313	$-10^{2}27.31$				20.00	55.00	2624.46	2634.71	438.93	-114.14	461
		.000	.000	.000	20.00	55.00					
1A-314	$-10^{2}26.98$				20.00	55.00	2624.46	2634.71	438.93	-114.14	461
		.000	.000	.000	20.00	55.00					
1A-315	$-10^{2}26.65$				20.00	55.00	2624.51	2692.56	439.41	-159.33	461
		.000	.000	.000	20.00	55.00					
1A-316	$-10^{2}26.98$				20.00	55.00	2624.51	2692.56	439.41	-159.33	461
		.000	.000	.000	20.00	55.00					
1A-317	$-10^{2}26.65$				20.00	55.00	2624.55	2735.55	439.96	-193.65	461
		.000	.000	.000	20.00	55.00					
1A-318	$-10^{2}25.99$				20.00	55.00	2624.58	2762.92	440.57	-215.45	461
		.000	.000	.000	20.00	55.00					
1A-319	$-10^{2}25.99$				20.00	55.00	2624.58	2762.92	440.57	-215.45	461
		.000	.000	.000	20.00	55.00					
1A-320	$-10^{2}25.99$				20.00	55.00	2624.58	2762.92	440.57	-215.45	461
		.000	.000	.000	20.00	55.00					

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INSTRUMENT OPERATION 6- 4-75 AT 0 HOURS 3 MINS 36 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)
166:14:15:24:491			IA-321	S	S	1	FLARE	X	4	5	ML	6	B	H1	OK	
	15:34:491	0:10: 0														OK
166:14:15:36:490			IA-322	S	S	1	FLARE	X	4	5	ML	6	B	H1	OK	
	16:16:239	0:39:749														OK
166:14:16:18:238			IA-323	S	S	1	FLARE	X	4	5	ML	6	B	H1	OK	
	18:57:484	2:39:246														OK
166:14:18:59:484			IA-324	L	L	1	FLARE	X	4	5	ML	6	B	H1	OK	
	19: 9:484	0:10: 0														OK
166:14:19:11:234			IA-325	L	L	1	FLARE	X	4	5	ML	6	B	H1	OK	
	19:51:232	0:39:998														OK
166:14:19:52:980			IA-326	L	L	1	FLARE	X	4	5	ML	6	B	H1	OK	
	22:32:471	2:39:491														OK
166:14:22:34:221			IA-327	S	S	1	FLARE	X	4	5	ML	6	B	H1	OK	
	22:36:721	0: 2:500														OK
166:14:22:38:720			IA-328	S	S	1	FLARE	X	4	5	ML	6	B	H1	OK	
	22:48:720	0:10: 0														OK
166:14:22:50:720			IA-329	S	S	1	FLARE	X	4	5	ML	6	B	H1	OK	
	23:30:468	0:39:748														OK
166:14:23:32:468			IA-330	S	S	1	FLARE	X	4	5	ML	6	B	H1	OK	
	23:42:467	0: 9:999														OK
166:14:23:44:467			IA-331	S	S	1	FLARE	X	4	5	ML	6	B	H1	OK	
	24:24:215	0:39:748														OK
166:14:24:26:215			IA-332	S	S	1	FLARE	X	4	5	ML	6	B	H1	OK	
	27: 5:459	2:39:244														OK
166:14:27: 7:459			IA-333	L	L	1	FLARE	X	4	5	ML	6	B	H1	OK	
	27:17:459	0:10: 0														OK
166:14:27:19:208			IA-334	L	L	1	FLARE	X	4	5	ML	6	B	H1	OK	
	27:59:207	0:39:999														OK
166:14:28: 0:957			IA-335	L	L	1	FLARE	X	4	5	ML	6	B	H1	OK	
	30:40:614	2:39:657														OK
166:14:33:49:605			IA-336	S	S	1	FLARE	X	4	5	MA	6	B	H1	OK	
	33:52:105	0: 2:500														OK
166:14:33:53:854			IA-337	S	S	1	FLARE	X	4	5	MA	6	B	H1	OK	
	34: 3:854	0:10: 0														OK
166:14:34: 5:854			IA-338	S	S	1	FLARE	X	4	5	MA	6	B	H1	OK	
	34:45:602	0:39:748														OK
166:14:34:47:602			IA-339	L	L	1	FLARE	X	4	5	MA	6	B	H1	OK	
	34:52:601	0: 4:999														OK
166:14:34:54:601			IA-340	L	L	1	FLARE	X	4	5	MA	6	B	H1	OK	
	35:14:600	0:19:999														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)
1A-321	-10225.99				20.00	55.00	2624.62	2774.18	441.25	-223.65	461
		.000	.000	.000	20.00	55.00					
1A-322	-10226.00				20.00	55.00	2624.62	2774.18	441.25	-223.65	461
		.000	.000	.000	20.00	55.00					
1A-323	-10224.00				20.00	55.00	2624.65	2769.11	441.99	-217.82	461
		.000	.000	.000	20.00	55.00					
1A-324	-10224.34				20.00	55.00	2624.74	2710.77	443.63	-165.77	461
		.000	.000	.000	20.00	55.00					
1A-325	-10223.66				20.00	55.00	2624.79	2658.61	444.51	-121.98	461
		.000	.000	.000	20.00	55.00					
1A-326	-10223.35				20.00	55.00	2624.79	2658.61	444.51	-121.98	461
		.000	.000	.000	20.00	55.00					
1A-327	-10222.04				20.00	55.00	2625.04	2421.25	447.30	55.97	461
		.000	.000	.000	20.00	55.00					
1A-328	-10222.04				20.00	55.00	2625.04	2421.25	447.30	55.97	461
		.000	.000	.000	20.00	55.00					
1A-329	-10222.04				20.00	55.00	2625.04	2421.25	447.30	55.97	461
		.000	.000	.000	20.00	55.00					
1A-330	-10222.04				20.00	55.00	2625.16	2318.92	448.24	122.56	461
		.000	.000	.000	20.00	55.00					
1A-331	-10222.04				20.00	55.00	2625.16	2318.92	448.24	122.56	461
		.000	.000	.000	20.00	55.00					
1A-332	-10221.38				20.00	55.00	2625.29	2206.90	449.16	188.53	461
		.000	.000	.000	20.00	55.00					
1A-333	-10220.06				20.00	55.00	2625.83	1823.33	451.67	359.28	461
		.000	.000	.000	20.00	55.00					
1A-334	-10220.06				20.00	55.00	2625.83	1823.33	451.67	359.28	461
		.000	.000	.000	20.00	55.00					
1A-335	-10219.07				20.00	55.00	2626.05	1682.78	452.38	400.34	461
		.000	.000	.000	20.00	55.00					
1A-336	-10216.76				20.00	55.00	2627.46	784.83	454.44	389.04	461
		.000	.000	.000	20.00	55.00					
1A-337	-10216.76				20.00	55.00	2627.46	773.41	454.44	385.87	461
		.000	.000	.000	20.00	55.00					
1A-338	-10216.43				20.00	55.00	2627.79	740.99	454.50	376.49	461
		.000	.000	.000	20.00	55.00					
1A-339	-10216.43				20.00	55.00	2627.79	627.58	454.50	338.86	461
		.000	.000	.000	20.00	55.00					
1A-340	-10216.43				20.00	55.00	2627.79	608.56	454.50	331.83	461
		.000	.000	.000	20.00	55.00					

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INSTRUMENT OPERATION 6- 4-75 AT 0 HOURS 3 MINS 36 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)
166:14:35:16:350	36:36: 96	1:19:746	IA-341	L	L	1	FLARE	X	4	5	MA	6	B	HI	OK	OK
166:14:36:38: 96	36:40:596	0: 2:500	IA-342	S	S	1	FLARE	X	4	5	MA	6	B	HI	OK	OK
166:14:36:42:596	36:52:345	0: 9:749	IA-343	S	S	1	FLARE	X	4	5	MA	6	B	HI	OK	OK
166:14:36:54:345	37:34:343	0:39:998	IA-344	S	S	1	FLARE	X	4	5	MA	6	B	HI	OK	OK
166:14:37:36: 93	37:46: 93	0:10: 0	IA-345	S	S	1	FLARE	X	4	5	MA	6	B	HI	OK	OK
166:14:37:48: 92	38:27:840	0:39:748	IA-346	S	S	1	FLARE	X	4	5	MA	6	B	HI	OK	OK
166:14:38:29:840	38:41:840	0:12: 0	IA-347	S	S	1	FLARE	X	4	5		6	B	HI	OK	OK
166:15:22: 0:214	22: 9:963	0: 9:749	IA-348	S	S	1	MAN	X	4	5	MA	6	B	HI	OK	OK
166:15:32:10:196	32:20: 29	0: 9:833	IA-349	S	S	1	MAN	X	4	5	MA	6	B	HI	OK	OK
166:15:42:49:744	42:59:243	0: 9:499	IA-350	S	S	1	MAN	X	4	5	MA	6	B	HI	OK	OK
166:15:53: 8:712	53:17:961	0: 9:249	IA-351	S	S	1	MAN	X	4	5	MA	6	B	HI	OK	OK
166:16: 5:48:185	5:58:184	0: 9:999	IA-352	S	S	1	MAN	X	4	5	MA	6	B	HI	OK	OK
166:16:55: 0:703	55: 3:203	0: 2:500	IA-353	S	S	1/4	AUTO 1	X	4	5	MA	6	X	HI	OK	OK
166:16:55: 5:203	55:15:202	0: 9:999	IA-354	S	S	1/4	AUTO 1	X	4	5	MA	6	X	HI	OK	OK
166:16:55:16:952	55:56:950	0:39:998	IA-355	S	S	1/4	AUTO 1	X	4	5	MA	6	X	HI	OK	OK
166:18:29:10:392	30:29:138	1:18:746	IA-356	L	L	1	MAN	X	X	5	MA	6	B	HI	OK	OK
166:18:50:42:228	50:47:478	0: 5:250	IA-357	L	L	1	MAN	X	4	5	MA	6	X	HI	OK	OK
166:20:15:56:847	16: 6:596	0: 9:749	IA-358	S	S	1	MAN	X	4	5	ML	6	B	HI	OK	OK
166:20:27:31:561	27:33:561	0: 2: 0	IA-359	S	S	1	MAN	X	4	5	ML	6	B	HI	OK	OK
166:20:33:21:543	33:31:543	0:10: 0	IA-360	S	S	1	MAN	X	X	5	ML	6	B	HI	OK	OK

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)
1A-341	$-10^{2}15.44$				20.00	55.00	2628.13	549.12	454.41	308.51	461
		.000	.000	.000	20.00	55.00					
1A-342	$-10^{2}14.45$				20.00	55.00	2628.48	324.69	454.19	202.58	461
		.000	.000	.000	20.00	55.00					
1A-343	$-10^{2}14.78$				20.00	55.00	2628.48	312.30	454.19	195.91	461
		.000	.000	.000	20.00	55.00					
1A-344	$-10^{2}14.78$				20.00	55.00	2628.48	279.94	454.19	178.11	461
		.000	.000	.000	20.00	55.00					
1A-345	$-10^{2}14.45$				20.00	55.00	2628.84	164.63	453.82	109.90	461
		.000	.000	.000	20.00	55.00					
1A-346	$-10^{2}14.45$				20.00	55.00	2628.84	131.47	453.82	88.95	461
		.000	.000	.000	20.00	55.00					
1A-347	$-10^{2}13.80$				20.00	55.00	2629.19	46.28	453.32	32.36	461
		.000	.000	.000	20.00	55.00					
1A-348	-9570.00				20.00	55.00	2637.42	-.86	433.63	433.63	461
		.000	.000	.000	20.00	55.00					
1A-349	-9564.85				20.00	55.00	2640.81	1147.47	436.78	434.44	461
		.000	.000	.000	20.00	55.00					
1A-350	-9559.90				20.00	55.00	2642.59	2441.40	438.10	25.59	461
		.000	.000	.000	20.00	55.00					
1A-351	-9555.29				20.00	55.00	2643.11	2592.52	445.28	-69.33	462
		.000	.000	.000	20.00	55.00					
1A-352	-9548.70				20.00	55.00	2645.35	982.17	454.26	431.86	462
		.000	.000	.000	20.00	55.00					
1A-353	$-10^{7}27.00$				20.00	55.00	2655.63	-.78	433.51	433.51	462
		.000	.000	.000	20.00	55.00					
1A-354	$-10^{7}27.00$				20.00	55.00	2655.63	-.78	433.51	433.51	462
		.000	.000	.000	20.00	55.00					
1A-355	$-10^{7}27.00$				20.00	55.00	2655.63	-.75	433.51	433.51	462
		.000	.000	.000	20.00	55.00					
1A-356	$6^{4}88.00$				20.00	55.00	2674.18	-401.98	433.93	387.38	463
		.000	.000	.000	20.00	55.00					
1A-357	$8^{2}40.58$				20.00	55.00	2679.26	2535.80	438.65	-39.90	463
		.000	.000	.000	20.00	55.00					
1A-358	$-10^{7}95.84$				20.00	55.00	2696.44	1592.68	436.91	400.60	464
		.000	.000	.000	20.00	55.00					
1A-359	$-10^{7}92.54$				20.00	55.00	2697.65	2691.10	440.70	-155.57	464
		.000	.000	.000	20.00	55.00					
1A-360	$-10^{7}90.24$				20.00	55.00	2697.93	2522.47	445.69	-16.90	464
		.000	.000	.000	20.00	55.00					

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)
166:21:49:39:734	49:59:400	0:19:666	IA-361	L	L	1	MAN	X	4	5	MA	6	X	HI	OK	OK
167:10:13:50:923	14:39:670	0:48:747	IA-362	L	L	1	MAN	X	4	5	GS	6	X	HI	OK	OK
167:10:26:10:135	26:59:632	0:49:497	IA-363	L	L	1	MAN	X	4	5	G3	6	X	HI	OK	OK
167:17:54:17:389	54:22:389	0: 5: 0	IA-364	L	L	1/4	AUTO 1	X	X	5	MA	6	X	HI	OK	OK
167:17:54:24:139	54:44:138	0:19:999	IA-365	L	L	1/4	AUTO 1	X	X	5	MA	6	X	HI	OK	OK
167:17:54:46:138	56: 5:634	1:19:496	IA-366	L	L	1/4	AUTO 1	X	4	5	MA	6	X	HI	OK	OK
167:20:55:46:880	55:56:879	0: 9:999	IA-367	L	L	1	MAN	X	4	5	MA	6	X	HI	OK	OK
167:21: 4: 1:861	4:11:860	0: 9:999	IA-368	L	L	1	MAN	X	4	5	G3	6	X	HI	OK	OK
167:21:30:50:551	39:56:524	9: 5:973	IA-369	S	S	1	MAN	X	4	5	MA	6	B	HI	OK	OK
168: 9:32:37:813	33:27: 60	0:49:247	IA-370	L	L	1	MAN	X	X	5	MA	6	X	HI	OK	OK
168:12:44:54:536	44:58:286	0: 3:750	IA-371	L	L	1	MAN	X	X	5	MA	6	X	HI	OK	OK
168:15:47:55: 31	48: 0: 31	0: 5: 0	IA-372	L	L	1/4	AUTO 1	X	X	5	MA	6	X	HI	OK	OK
168:15:48: 2: 31	48:22: 30	0:19:999	IA-373	L	L	1/4	AUTO 1	X	X	5	MA	6	X	HI	OK	OK
168:15:48:24: 30	49:43:526	1:19:496	IA-374	L	L	1/4	AUTO 1	X	X	5	MA	6	X	HI	OK	OK
168:17: 5: 0:692	5:10:691	0: 9:999	IA-375	S	S	1	AUTO 1	X	X	5	MA	6	X	HI	OK	OK
168:17: 5:12:691	5:52:439	0:39:748	IA-376	S	S	1	AUTO 1	X	X	5	MA	6	X	HI	OK	OK
168:17: 5:54:439	8:33:681	2:39:242	IA-377	S	S	1	AUTO 1	X	X	5	MA	6	X	HI	OK	OK
168:21:51:27:518	51:37:518	0:10: 0	IA-378	L	L	1	MAN	X	4	5	MA	X	X	HI	OK	OK
168:21:59:52:757	0: 2:757	0:10: 0	IA-379	L	L	1	MAN	X	4	5	G3	X	X	HI	OK	OK
169:10:21: 4:464	21:53:712	0:49:248	IA-380	L	L	1	MAN	X	4	5	GS	6	X	HI	OK	OK

FRAME COUNT	GAMRR (ARCMINS)	MAX PT EXC (ARCSEC)		(ARCMINS)	--NRL BIAS-- (ARCSEC)		ANGLE (ARCMINS) -B-	-E-	ALTITUDE (KM)	Z(M) (KM)	ORBIT NUMBER
		GAMX	GAMY	GAMRR	GXBI	GYBI	OPEN	OPEN			
(D)	(R)	(S)	(T)	(U)			(V)	(W)	(X)	(Y)	(Z)
1A-361	$-10^{7}83.98$				20.00	55.00	2714.67	1689.93	437.07	378.23	465
		.000	.000	.000	20.00	55.00					
1A-362	$-10^{7}93.53$				20.00	55.00	2859.55	1351.94	436.44	432.63	473
		.000	.000	.000	20.00	55.00					
1A-363	$-5^{3}96.93$				20.00	55.00	2860.93	2525.60	440.82	-28.36	473
		.000	.000	.000	20.00	55.00					
1A-364	$9^{8}55.00$				20.00	55.00	2948.48	609.55	435.86	322.95	477
		.000	.000	.000	20.00	55.00					
1A-365	$9^{8}55.00$				20.00	55.00	2948.48	626.16	435.86	328.84	477
		.000	.000	.000	20.00	55.00					
1A-366	$9^{8}55.00$				20.00	55.00	2948.48	680.32	435.86	346.95	477
		.000	.000	.000	20.00	55.00					
1A-367	$-10^{6}45.00$				20.00	55.00	2982.90	-140.50	434.60	428.90	480
		.000	.000	.000	20.00	55.00					
1A-368	$-4^{9}95.00$				20.00	55.00	2985.50	1061.70	434.16	329.59	480
		.000	.000	.000	20.00	55.00					
1A-369	$-7^{9}45.00$				20.00	55.00	2988.40	1707.50	434.16	329.59	480
		.000	.000	.000	20.00	55.00					
1A-370	$-10^{7}85.00$				20.00	55.00	3129.16	1338.42	436.32	433.35	487
		.000	.000	.000	20.00	55.00					
1A-371	$-10^{7}75.74$				20.00	55.00	3165.41	1829.91	437.59	337.02	489
		.000	.000	.000	20.00	55.00					
1A-372	$10^{7}64.86$				20.00	55.00	3200.36	1453.34	436.64	423.18	490
		.000	.000	.000	20.00	55.00					
1A-373	$10^{7}64.86$				20.00	55.00	3200.51	1560.65	436.87	406.81	490
		.000	.000	.000	20.00	55.00					
1A-374	$10^{7}64.86$				20.00	55.00	3200.51	1560.65	436.87	406.81	490
		.000	.000	.000	20.00	55.00					
1A-375	$-10^{7}68.00$				20.00	55.00	3213.67	-545.12	433.43	347.95	491
		.000	.000	.000	20.00	55.00					
1A-376	$-10^{7}68.00$				20.00	55.00	3213.67	-518.16	433.43	356.16	491
		.000	.000	.000	20.00	55.00					
1A-377	$-10^{7}68.00$				20.00	55.00	3213.67	-424.35	433.43	381.56	491
		.000	.000	.000	20.00	55.00					
1A-378	$10^{7}21.00$				25.00	55.00	3268.66	355.87	435.34	213.48	494
		.000	.000	.000	25.00	55.00					
1A-379	$-5^{3}88.36$				25.00	55.00	3270.71	1296.08	436.28	435.27	494
		.000	.000	.000	25.00	55.00					
1A-380	$10^{7}95.51$				20.00	55.00	3409.12	760.58	435.52	370.52	502
		.000	.000	.000	20.00	55.00					

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INSTRUMENT OPERATION 6- 4-75 AT 0 HOURS 3 MINS 36 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)
169:10:29:49:692			IA-381	L	L	1	MAN	X	4	5	G3	6	X	H1	OK	
	30:38:689	0:48:997														OK
169:12: 3: 2:539			IA-382	L	L	1	MAN	X	X	5		6	X	H1	OK	
	3: 6:539	0: 4: 0														OK
169:12:19: 2:490			IA-383	L	L	1	MAN	X	4	5	MA	6	X	H1	OK	
	19:12:490	0:10: 0														OK
169:15:12:44:416			IA-384	S	S	1/4	AUTO 1	X	X	5	MA	6	X	H1	OK	
	12:46:916	0: 2:500														OK
169:15:12:48:916			IA-385	S	S	1/4	AUTO 1	X	X	5	MA	6	X	H1	OK	
	12:58:915	0: 9:999														OK
169:15:13: 0:665			IA-386	S	S	1/4	AUTO 1	X	X	5	MA	6	X	H1	OK	
	13:40:663	0:39:998														OK
169:16:22:29:710			IA-387	S	S	1	MAN	X	4	5	MA	6	X	H1	OK	
	22:39:709	0: 9:999														OK
169:16:31:30:182			IA-388	S	S	1	MAN	X	4	5	MA	6	X	H1	OK	
	31:40:432	0:10:250														OK
169:21: 5:30:155			IA-389	L	L	1	MAN	X	4	5	MA	6	X	H1	OK	
	5:40:155	0:10: 0														OK
169:21:33:10:118			IA-390	L	L	1	MAN	X	4	5	MA	6	X	H1	OK	
	33:20:118	0:10: 0														OK
169:21:38:40:350			IA-391	L	L	1	MAN	X	X	5	GS	6	X	H1	OK	
	39:56:346	1:15:996														OK
169:21:40:17:595			IA-392	L	L	1	MAN	X	X	5	MA	6	X	H1	OK	
	41:37: 91	1:19:496														OK
169:21:45: 0:332			IA-393	L	L	1	MAN	X	X	5	MA	6	X	H1	OK	
	45:10: 81	0: 9:749														OK
170: 6:29:43:390			IA-394	L	L	1	AUTO 2	X	X	5	MA	X	X	X	OK	
	30: 3:138	0:19:748														OK
170: 6:30: 5:138			IA-395	S	S	1	AUTO 2	X	X	5	MA	X	X	X	OK	
	30:15:137	0: 9:999														OK
170: 6:30:17:137			IA-396	L	L	1	AUTO 2	X	X	5	GS	X	X	X	OK	
	31:36:634	1:19:497														OK
170: 6:31:38:634			IA-397	S	S	1	AUTO 2	X	X	5	MA	X	X	X	OK	
	32:18:382	0:39:748														OK
170: 6:32:20:382			IA-398	L	L	1	AUTO 2	X	X	5	MA	X	X	X	OK	
	37:39:115	5:18:733														OK
170: 6:37:40:865			IA-399	S	S	1	AUTO 2	X	X	5	MA	X	X	X	OK	
	40:20:356	2:39:491														OK
170: 0: 0: 0: 0			IA-400													
	0: 0: 0	0: 0: 0														
170: 0: 0: 0: 0			IA-401													
	0: 0: 0	0: 0: 0														

FRAME COUNT	GAMRR (ARCMINS)	MAX PT EXC (ARCSEC) GAMX	GAMY	(ARCMINS) GAMRR	--NRL BIAS-- (ARCSEC) GXB1	GYB1	ANGLE (ARCMINS) -B- OPEN	-E- OPEN	ALTITUDE (KM)	Z(M) (KM)	ORBIT NUMBER
(D)	(R)	(S)	(T)	(U)			(V)	(W)	(X)	(Y)	(Z)
1A-381	$5^{341}.00$				20.00	55.00	3410.44	1580.79	437.35	403.55	502
		.000	.000	.000	20.00	55.00					
1A-382	$8^{862}.83$				20.00	55.00	3427.66	1625.26	437.72	304.01	503
		.000	.000	.000	20.00	55.00					
1A-383	$8^{234}.98$				20.00	55.00	3428.56	1698.34	452.01	395.99	503
		.000	.000	.000	20.00	55.00					
1A-384	$-9^{127}.16$				20.00	55.00	3462.12	1759.40	439.27	361.85	504
		.000	.000	.000	20.00	55.00					
1A-385	$-9^{127}.16$				20.00	55.00	3462.12	1759.40	439.27	361.85	504
		.000	.000	.000	20.00	55.00					
1A-386	$-9^{127}.16$				20.00	55.00	3462.16	1811.42	440.01	346.63	504
		.000	.000	.000	20.00	55.00					
1A-387	$10^{784}.16$				20.00	55.00	3473.91	-669.59	432.82	304.01	505
		.000	.000	.000	20.00	55.00					
1A-388	$10^{787}.27$				20.00	55.00	3476.93	421.31	435.07	245.02	505
		.000	.000	.000	20.00	55.00					
1A-389	$5^{386}.00$				25.00	60.00	3525.97	-284.35	434.03	410.70	508
		.000	.000	.000	25.00	60.00					
1A-390	$-5^{559}.75$				25.00	60.00	3530.33	1849.73	446.92	343.67	508
		.000	.000	.000	25.00	60.00					
1A-391	$-9^{821}.92$				25.00	60.00	3530.78	1653.92	452.00	406.68	508
		.000	.000	.000	25.00	60.00					
1A-392	$-9^{821}.59$				25.00	60.00	3531.10	1520.32	453.65	434.05	508
		.000	.000	.000	25.00	60.00					
1A-393	$-9^{819}.61$				25.00	60.00	3532.26	1080.67	455.94	446.34	508
		.000	.000	.000	25.00	60.00					
1A-394	$-10^{662}.69$				25.00	60.00	3628.17	271.81	434.80	413.52	514
		.000	.000	.000	25.00	60.00					
1A-395	$-10^{658}.73$				25.00	60.00	3628.17	271.81	434.83	169.24	514
		.000	.000	.000	25.00	60.00					
1A-396	$-10^{658}.73$				25.00	60.00	3628.17	271.81	434.83	169.24	514
		.000	.000	.000	25.00	60.00					
1A-397	$-10^{659}.72$				25.00	60.00	3628.46	384.10	434.92	227.29	514
		.000	.000	.000	25.00	60.00					
1A-398	$-10^{658}.07$				25.00	60.00	3628.73	495.06	435.00	277.75	514
		.000	.000	.000	25.00	60.00					
1A-399	$-10^{657}.09$				25.00	60.00	3629.79	1015.14	435.79	421.71	514
		.000	.000	.000	25.00	60.00					
1A-400	.00				.00	.00	.00	.00	.00	.00	0
		.000	.000	.000	.00	.00					
1A-401	.00				.00	.00	.00	.00	.00	.00	0
		.000	.000	.000	.00	.00					

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INSTRUMENT OPERATION 6- 4-75 AT 0 HOURS 3 MINS 36 SECS
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SHUTTER			FRAME COUNT	WVL		MULT	MODE	OP EXP							TEMP	
OPEN	CLOSE	EXPOSURE TIME		-G-	-M-										OP	CL
(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)
165:23:59:30:590			IA-402	L	L	I	MAN	X	4	5	G3	6	X	HI	OK	
	0:19:340	0:48:750														OK

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INSTRUMENT OPERATION 6- 4-75 AT 0 HOURS 3 MINS 36 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
		GAMX	GAMY	GAMRR	GXB1	GYB1	-B- OPEN	-E- OPEN			
(D)	(R)	(S)	(T)	(U)			(V)	(W)	(X)	(Y)	(Z)
1A-422	5307.00				20.00	55.00	2458.00	-307.16	434.30	407.14	482
		.000	.000	.000	20.00	55.00					

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.

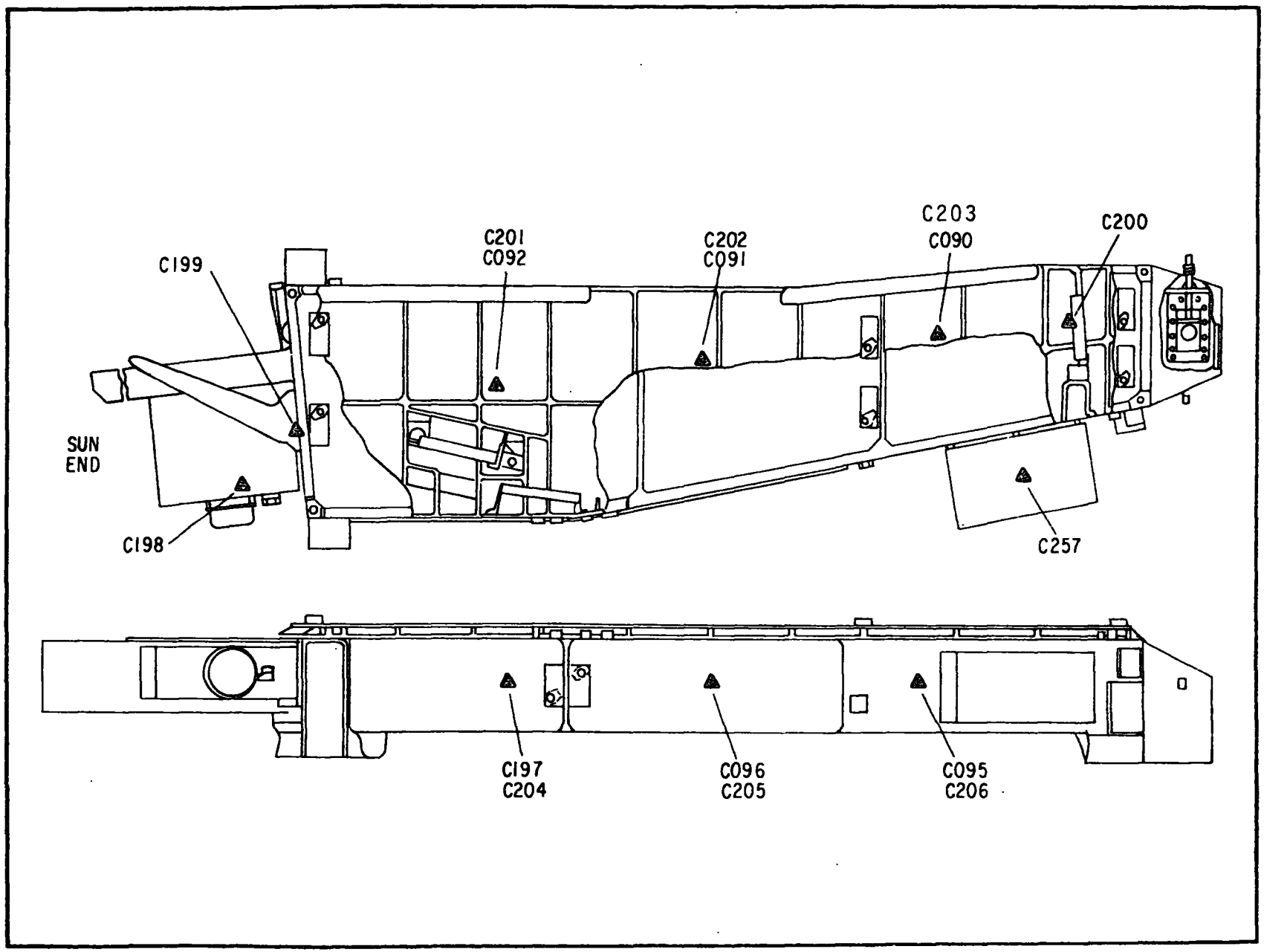

Figure 6-1. Measurement Locations for NRL-A (S082A)

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TEMPERATURE DATA 6- 4-75 AT 0 HOURS 3 MINS 36 SECS
PAGE 1

		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)
1A-201	158:18:39:37:957	67.67	68.62	68.62	67.91	68.84	68.71	67.47	.50	.23	.32	-.14	-.02	.01
1A-202	159: 2: 5:35:898	62.05	62.70	63.32	62.30	63.84	63.53	62.46	1.12	.90	.87	.38	.62	-.77
1A-203	160: 1:20:16:909	67.63	68.47	68.34	67.91	68.84	68.59	67.47	.83	.41	.50	-.24	.03	.01
1A-204	160: 1:27:22:142	67.63	68.47	68.41	67.91	68.87	68.62	67.58	.82	.41	.48	-.26	.07	-.02
1A-205	160:13:33: 0:119	67.79	68.47	68.34	67.91	68.84	68.53	67.29	.83	.41	.48	-.20	.04	-.02
1A-206	160:13:43:28:838	67.63	68.44	68.34	67.88	68.87	68.53	67.41	.85	.46	.48	-.18	.04	-.02
1A-207	160:19:56:38:296	67.79	68.56	68.37	68.04	68.99	68.50	67.81	.83	.40	.48	-.18	.05	-.02
1A-209	160:20: 0:58:284	67.76	68.53	68.34	68.04	68.90	68.59	67.93	.82	.41	.48	-.18	.03	-.04
1A-210	160:21: 8:18: 34	67.97	68.59	68.47	68.13	69.02	68.62	68.39	.83	.40	.44	-.18	.05	-.06
1A-213	161: 0:17:18: 63	67.73	68.53	68.41	67.97	68.90	68.53	67.58	.82	.41	.48	-.22	.05	.01
1A-214	161: 0:35:12:269	67.73	68.53	68.41	67.97	68.90	68.53	67.58	.82	.41	.48	-.22	.05	.01
1A-215	161: 1:46:27:574	67.63	68.53	68.34	67.97	68.90	68.65	67.47	.82	.41	.48	-.22	.05	.01
1A-216	161:16: 1:45:929	67.73	68.53	68.41	67.97	68.90	68.53	67.58	.82	.41	.48	-.22	.05	.01
1A-217	161:16:10:47:402	67.63	68.53	68.34	67.97	68.90	68.65	67.47	.82	.41	.48	-.22	.05	.01
1A-218	161:17:21:10:781	67.85	68.59	68.47	68.04	68.96	68.59	68.27	.81	.41	.45	-.24	.03	-.09
1A-221	161:18:59:47:900	68.10	68.65	68.59	68.25	69.05	68.78	68.96	.79	.37	.40	-.22	.03	-.11
1A-222	161:19:15:51:644	68.13	68.71	68.53	68.34	69.08	68.78	69.08	.79	.38	.40	-.25	.02	-.10
1A-223	161:20:23:55: 83	68.34	68.84	68.62	68.47	69.21	68.84	69.43	.76	.34	.38	-.30	.01	-.12
1A-224	161:20:33:24:803	68.34	68.84	68.71	68.53	69.21	68.84	69.66	.77	.36	.36	-.26	.01	-.10
1A-225	161:20:50:16:624	68.34	68.84	68.62	68.59	69.21	68.87	69.77	.79	.34	.34	-.28	.01	-.12
1A-226	161:21:58:33: 50	68.47	68.90	68.78	68.59	69.24	68.90	69.83	.74	.32	.32	-.30	.01	-.10
1A-227	161:22:26:53:682	68.59	69.08	68.84	68.78	69.33	69.02	70.06	.73	.29	.29	-.28	.01	-.10
1A-228	162: 1:10: 0:140	68.62	69.14	68.84	68.84	69.39	68.96	69.83	.73	.30	.32	-.30	.01	-.10
1A-229	162: 1:19:25:111	68.62	69.08	68.84	68.78	69.39	69.02	69.60	.74	.32	.32	-.26	.01	-.09
1A-230	162: 1:40:43:470	68.59	69.08	68.84	68.78	69.39	69.02	69.60	.73	.33	.32	-.38	-.04	-.10
1A-231	162:13:42:31:560	67.76	68.59	68.37	68.04	68.87	68.59	67.58	.82	.40	.48	-.25	.03	-.02
1A-232	162:13:52:16: 30	67.79	68.59	68.47	68.04	68.96	68.62	67.76	.85	.40	.48	-.22	.04	-.02
1A-233	162:18:10:16:206	67.97	68.62	68.47	68.13	69.08	68.62	67.93	.81	.38	.43	-.26	.01	-.04
1A-235	162:18:30:55:178	67.97	68.62	68.53	68.22	69.02	68.62	68.16	.83	.40	.43	-.24	.01	-.04
1A-236	162:18:35:55:323	67.97	68.65	68.47	68.28	69.02	68.62	68.16	.81	.38	.42	-.18	.03	-.04
1A-237	162:19:45: 5:977	68.13	68.71	68.59	68.34	69.08	68.78	68.68	.79	.38	.41	-.20	.05	-.09
1A-237	162:19:50: 6:121	68.10	68.62	68.56	68.28	69.08	68.74	68.73	.81	.38	.41	-.18	.03	-.06
1A-237	162:19:55: 6:130	68.13	68.68	68.59	68.25	69.08	68.78	68.79	.79	.38	.40	-.24	.03	-.09
1A-237	162:20: 0: 6:165	68.10	68.62	68.59	68.28	69.08	68.71	68.96	.81	.38	.40	-.22	.03	-.09
1A-237	162:20: 5: 6:176	68.10	68.71	68.59	68.41	69.11	68.78	68.85	.79	.38	.41	-.18	.03	-.09
1A-237	162:20:10: 6:246	68.10	68.71	68.50	68.34	69.11	68.68	68.85	.83	.37	.40	-.22	.04	-.09
1A-237	162:20:15: 6:123	68.13	68.84	68.65	68.34	69.08	68.78	68.96	.81	.35	.40	-.22	.03	-.09
1A-237	162:20:20: 6:382	68.16	68.78	68.59	68.34	69.11	68.84	69.08	.81	.36	.40	-.20	.03	-.09
1A-237	162:20:25: 6:616	68.13	68.74	68.59	68.34	69.11	68.78	69.08	.81	.37	.40	-.18	.05	-.06
1A-237	162:20:30: 6:674	68.13	68.78	68.62	68.34	69.11	68.84	69.14	.81	.38	.40	-.25	.01	-.09

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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)
1A-238	162:21:26:27:461	68.28	68.84	68.65	68.47	69.21	68.84	69.43	.79	.34	.36	-.21	.01	-.10
1A-239	162:21:40:33:224	68.34	68.87	68.65	68.53	69.21	68.87	69.31	.74	.38	.38	-.25	.04	-.08
1A-240	163: 0:26:59:516	68.47	68.87	68.71	68.59	69.21	68.84	69.14	.77	.32	.33	-.26	-.02	-.09
1A-241	163: 0:59:26:166	68.47	68.96	68.78	68.59	69.24	68.90	69.54	.77	.30	.34	4.78	-.02	-.09
1A-242	163: 1:56:10:770	68.50	68.96	68.78	68.62	69.33	69.02	69.54	.74	.34	.32	-.28	.01	-.10
1A-243	163:14:32:15:250	67.91	68.78	68.99	68.10	69.11	69.11	67.47	.83	.40	.50	-.25	.05	-.02
1A-244	163:14:45: 4:129	67.76	68.47	68.44	67.91	68.90	68.59	67.58	.83	.41	.48	-.22	.03	-.02
1A-245	163:16: 1:36:163	67.91	68.59	68.53	68.10	69.02	68.62	68.22	.81	.40	.45	-.18	.03	-.06
1A-246	163:16:20:15:114	67.91	68.56	68.53	68.13	69.02	68.62	68.62	.81	.38	.41	-.17	.03	-.06
1A-247	163:17:32: 6:406	68.10	68.74	68.59	68.28	69.11	68.84	68.96	.79	.38	.40	-.25	.03	-.10
1A-248	163:17:49:16:125	68.13	68.84	68.62	68.34	69.08	68.87	69.31	.77	.37	.39	-.20	.03	-.09
1A-249	163:18: 1:26:587	68.22	68.84	68.65	68.34	69.11	68.84	69.43	.77	.36	.37	-.26	.01	-.09
1A-250	163:19:16:43:378	68.41	68.87	68.78	68.53	69.27	68.96	69.66	.75	.33	.35	-.25	.01	-.12
1A-251	163:19:32: 3:799	68.37	68.90	68.78	68.53	69.14	68.96	69.77	.73	.33	.32	-.28	-.01	-.10
1A-252	163:20:35:37:901	68.59	69.02	68.84	68.74	69.33	68.99	70.12	.74	.34	.29	-.29	.05	-.10
1A-253	163:20:53:36:364	68.59	69.02	68.81	68.78	69.33	69.02	70.23	.74	.33	.28	-.26	.01	-.13
1A-254	163:21: 0:44:636	68.59	69.08	68.90	68.71	69.33	69.08	70.23	.73	.32	.29	-.25	-.05	-.12
1A-255	163:21:25: 1:775	68.62	69.11	68.90	68.84	69.36	76.85	70.35	.71	.29	.28	-.29	-.03	-.13
1A-259	163:22: 9:53:653	68.74	69.11	68.96	68.87	69.45	69.08	70.46	.73	.29	.27	-.30	-.02	-.12
1A-262	164: 1:19:32:891	68.84	69.11	68.99	68.96	69.45	69.08	69.89	.73	.29	.26	-.33	-.06	-.10
1A-263	164: 1:28: 7:365	68.78	69.11	68.96	68.96	69.45	69.14	70.00	.72	.27	.29	-.30	-.05	-.10
1A-264	164:15:37:21:989	67.73	68.53	68.37	67.91	68.87	68.59	67.47	.83	.40	.48	-.22	.05	.01
1A-265	164:15:45:10:215	67.67	68.53	68.37	67.97	68.84	68.59	67.47	.81	.41	.48	-.20	.05	-.02
1A-266	164:18:19:35:928	67.97	68.62	68.47	68.13	69.02	68.62	68.16	.82	.40	.44	-.22	.03	-.07
1A-270	164:18:24:35:988	68.04	68.59	68.47	68.13	69.02	68.62	68.16	.81	.39	.41	-.24	.05	-.08
1A-271	164:18:29:36:156	67.97	68.78	68.50	68.10	68.93	68.62	68.16	.81	.41	.41	-.20	.03	-.04
1A-273	164:20: 0:37:183	68.10	68.74	68.59	68.28	69.08	68.84	68.96	.79	.36	.42	-.27	.05	-.09
1A-274	164:20: 5:37:317	68.10	68.78	68.62	68.28	69.08	68.84	68.85	.78	.40	.40	-.28	-.01	-.09
1A-274	164:20:10:37:417	68.10	68.74	68.62	68.25	69.08	68.78	68.96	.78	.36	.38	-.26	.03	-.09
1A-274	164:20:15:37:654	68.10	68.74	68.59	68.28	69.11	68.84	68.96	.77	.36	.39	-.25	.03	-.09
1A-274	164:20:20:37:708	68.13	68.84	68.62	68.34	69.08	68.84	69.08	.76	.38	.40	-.30	.01	-.09
1A-275	164:23: 0:12:132	68.34	68.90	68.78	68.59	69.27	68.96	69.08	.74	.34	.36	-.25	.01	-.09
1A-276	165: 0:31:42: 9	68.47	69.02	68.84	68.59	69.33	69.02	69.54	.73	.33	.33	-.26	-.01	-.09
1A-278	165: 1: 6:27:433	68.53	69.02	68.96	68.62	69.33	69.08	69.66	.73	.29	.32	-.29	.03	-.10
1A-279	165: 6:52: 0: 40	68.22	68.74	68.71	68.47	69.11	68.87	68.22	.77	.34	.40	-.26	-.04	-.05
1A-283	165: 6:57: 0:199	68.13	68.84	68.65	68.37	69.11	68.84	68.22	.77	.38	.40	-.25	-.02	-.04
1A-285	165:13:22:19:624	67.88	68.59	68.47	68.04	68.96	68.62	67.70	.79	.40	.45	-.28	.01	-.02
1A-286	165:13:39:37:993	67.85	68.53	68.47	68.04	68.96	68.62	67.81	.81	.40	.48	-.25	.01	.01
1A-287	165:17:40:29:346	67.97	68.62	68.47	68.10	68.99	68.59	67.93	.81	.40	.46	-.22	.03	-.04

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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)
1A-288	165:17:48:12:636	67.88	68.65	68.47	68.16	68.96	68.62	67.93	.82	.40	.46	-.20	.03	.01
1A-289	165:19: 9:22:894	68.04	68.71	68.59	68.22	69.08	68.78	68.62	.79	.40	.42	-.25	.04	-.09
1A-292	165:19:48:58:507	68.13	68.71	68.62	68.34	69.08	68.84	69.08	.79	.38	.40	-.29	.03	-.09
1A-293	165:20:44:35:891	68.28	68.84	68.71	68.44	69.24	68.87	69.14	.74	.36	.37	-.26	.01	-.10
1A-296	165:21:22: 6:950	68.34	68.90	68.78	68.53	69.27	69.02	69.54	.74	.34	.36	-.26	.03	-.12
1A-299	165:22:16:43:381	68.47	68.96	68.78	68.59	69.33	69.02	69.89	.73	.33	.32	-.28	-.01	-.13
1A-300	165:23:51: 2:367	68.62	69.08	68.93	68.84	69.45	69.08	70.23	.73	.32	.29	-.25	-.05	-.14
1A-301	166: 5: 6:24:510	68.47	68.96	68.84	68.59	69.33	68.96	68.62	.77	.32	.36	-.28	.01	-.06
1A-307	166:10:56:51: 39	67.97	68.62	68.59	68.13	69.08	68.62	67.81	.78	.38	.44	-.26	.03	-.02
1A-308	166:11: 4:36:515	67.97	68.62	68.59	68.13	69.08	68.78	67.81	.79	.40	.48	-.28	-.01	-.02
1A-309	166:12:18:45:814	68.00	68.71	68.62	68.13	69.02	68.84	68.50	.78	.38	.38	-.26	.05	-.06
1A-310	166:12:59:48:692	68.13	68.78	68.78	68.28	69.11	68.87	68.96	.77	.38	.40	-.26	.03	-.09
1A-311	166:13:52:38: 53	68.22	68.84	68.84	68.37	69.21	68.96	69.25	.74	.36	.38	-.25	.03	-.10
1A-312	166:14:11:37:753	68.28	68.87	68.78	68.47	69.21	68.99	69.43	.74	.36	.36	-.22	.01	-.10
1A-322	166:14:15:44:490	68.34	68.84	68.84	68.47	69.27	68.96	69.43	.79	.34	.38	-.18	.01	-.09
1A-323	166:14:17:57:672	68.28	69.14	69.02	68.47	69.27	68.96	69.45	.79	.34	.36	-.19	.03	-.09
1A-327	166:14:22:34:221	68.28	68.90	68.84	68.47	69.21	69.02	69.54	.74	.36	.36	-.25	.03	-.10
1A-333	166:14:27: 7:459	68.28	68.96	68.84	68.50	69.27	68.96	69.54	.73	.36	.37	-.18	.02	-.10
1A-336	166:14:33:49:605	68.34	68.93	68.84	68.53	69.27	69.02	69.54	.73	.34	.33	-.26	.03	-.10
1A-347	166:14:38:29:840	68.37	68.96	68.84	68.59	69.27	69.02	69.66	.73	.36	.36	-.25	-.02	-.10
1A-348	166:15:22: 0:214	68.47	68.99	68.96	68.62	69.33	69.08	69.89	.73	.32	.32	-.26	-.01	-.10
1A-349	166:15:32:10:196	68.47	68.99	68.96	68.62	69.27	69.08	69.83	.73	.33	.32	-.26	.01	-.12
1A-350	166:15:42:49:744	68.53	69.08	68.90	68.62	69.36	69.08	69.89	.73	.32	.32	-.30	.01	-.10
1A-351	166:15:53: 8:712	68.59	69.08	68.96	68.71	69.33	69.11	69.89	.73	.32	.32	-.28	.01	-.12
1A-352	166:16: 5:48:185	68.59	69.08	68.99	68.71	69.33	69.11	70.00	.73	.32	.29	-.35	.01	-.12
1A-353	166:16:54:30:704	68.62	69.14	69.02	68.84	69.39	69.11	70.23	.66	.29	.29	-.30	.01	-.12
1A-356	166:18:29:10:392	68.84	69.21	69.08	68.96	69.48	69.30	70.52	.69	.29	.24	-.30	-.06	-.14
1A-357	166:18:50:42:228	68.84	69.21	69.08	68.96	69.58	69.33	70.58	.66	.27	.24	-.35	-.02	-.14
1A-358	166:20:15:56:847	68.96	69.33	69.11	69.08	69.58	69.33	70.69	.69	.24	.23	-.26	-.04	-.10
1A-359	166:20:27:31:561	68.96	69.33	69.11	69.05	69.58	69.33	70.75	.66	.24	.24	-.28	-.04	-.14
1A-360	166:20:33:21:543	68.96	69.33	69.11	69.02	69.58	69.33	70.69	.69	.24	.25	-.37	-.03	-.17
1A-361	166:21:49:39:734	69.02	69.36	69.21	69.11	69.58	69.33	70.81	.65	.24	.23	-.37	-.06	-.14
1A-362	167:10:13:50:923	68.00	68.71	68.62	68.10	69.08	68.78	67.70	.79	.42	.45	-.30	.01	.01
1A-363	167:10:26:10:135	67.97	68.71	68.59	68.13	69.08	68.84	67.70	.79	.38	.48	-.26	.03	-.02
1A-364	167:17:54:17:389	67.85	68.59	68.59	68.04	68.99	68.71	67.70	.79	.40	.48	-.25	.03	.01
1A-367	167:20:55:46:880	67.97	68.71	68.62	68.13	69.08	68.81	67.99	.77	.38	.44	-.26	.03	-.05
1A-368	167:21: 4: 1:861	67.97	68.71	68.62	68.13	68.99	68.84	68.16	.78	.38	.44	-.25	.01	-.04
1A-369	167:21:30:50:551	67.97	68.71	68.62	68.13	69.08	68.84	68.22	.79	.36	.41	-.28	.01	-.06
1A-370	168: 9:32:37:813	67.79	68.59	68.59	67.97	69.02	68.68	67.29	.80	.40	.48	-.29	.01	.02
1A-371	168:12:44:54:536	68.22	68.90	68.84	68.41	69.11	69.02	68.96	.74	.38	.38	-.26	.03	-.10

S082A-EDB
TEMPERATURE DATA 6- 4-75 AT 0 HOURS 3 MINS 36 SECS
PAGE 4

		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)
1A-372	168:15:47:55: 31	68.47	69.08	68.84	68.59	69.33	69.08	69.08	.79	.32	.38	-.30	-.04	-.08
1A-375	168:17: 5: 0:692	68.47	69.08	69.08	68.62	69.39	69.21	69.54	.71	.32	.32	-.30	-.04	-.11
1A-378	168:21:51:27:518	68.62	69.11	69.11	68.78	69.45	69.33	69.89	.69	.29	.32	-.39	-.09	-.09
1A-379	168:21:59:52:757	68.62	69.11	69.11	68.84	69.39	69.21	69.66	.69	.27	.29	-.35	-.04	-.12
1A-380	169:10:21: 4:464	67.91	68.78	68.78	68.13	69.11	68.90	67.70	.74	.37	.44	-.26	.03	-.02
1A-381	169:10:29:49:692	67.91	68.74	68.71	68.16	69.08	68.90	67.70	.77	.38	.44	-.26	.04	-.02
1A-382	169:12: 3: 2:539	68.10	68.78	68.87	68.25	69.11	68.99	68.50	.73	.37	.40	-.26	-3.18	-.09
1A-383	169:12:19: 2:490	68.16	68.84	68.90	68.37	69.11	69.08	68.73	.74	.35	.38	-.28	.03	-.09
1A-384	169:15:12:44:416	68.34	69.08	68.96	68.65	69.33	69.11	68.85	.73	.34	.38	-.33	.01	-.09
1A-387	169:16:22:29:710	68.41	69.02	69.08	68.59	69.30	69.11	69.08	.70	.32	.34	-.30	-.02	-.10
1A-388	169:16:31:30:182	68.41	69.02	69.08	68.59	69.33	69.21	69.14	.71	.34	.36	-.34	-.02	-.09
1A-389	169:21: 5:30:155	68.50	69.11	69.08	68.62	69.39	69.21	68.91	.66	.33	.35	-.29	-.04	.01
1A-390	169:21:33:10:118	68.53	69.11	69.05	68.62	69.39	69.27	69.08	.70	.32	.33	-.35	-.02	-.06
1A-391	169:21:38:40:350	68.47	69.11	69.08	68.62	69.39	69.27	69.08	.71	.32	.34	-.34	.01	-.06
1A-393	169:21:45: 0:332	68.47	69.02	69.08	68.65	69.45	69.21	69.08	.69	.30	.34	-.38	.01	-.06
1A-394	170: 6:29:43:390	68.04	68.84	68.84	68.28	69.11	69.02	67.93	.77	.38	.41	-.26	.01	.01
1A-399	170: 6:37:40:865	68.04	68.78	68.84	68.28	69.11	68.99	67.76	.73	.36	.41	-.26	.01	.01
1A-402	165:23:59:30:590	68.62	69.11	68.96	68.84	69.45	69.11	70.23	.73	.29	.29	-.25	.01	-.12

ASSIGNED TASK COMPLETED

Ball