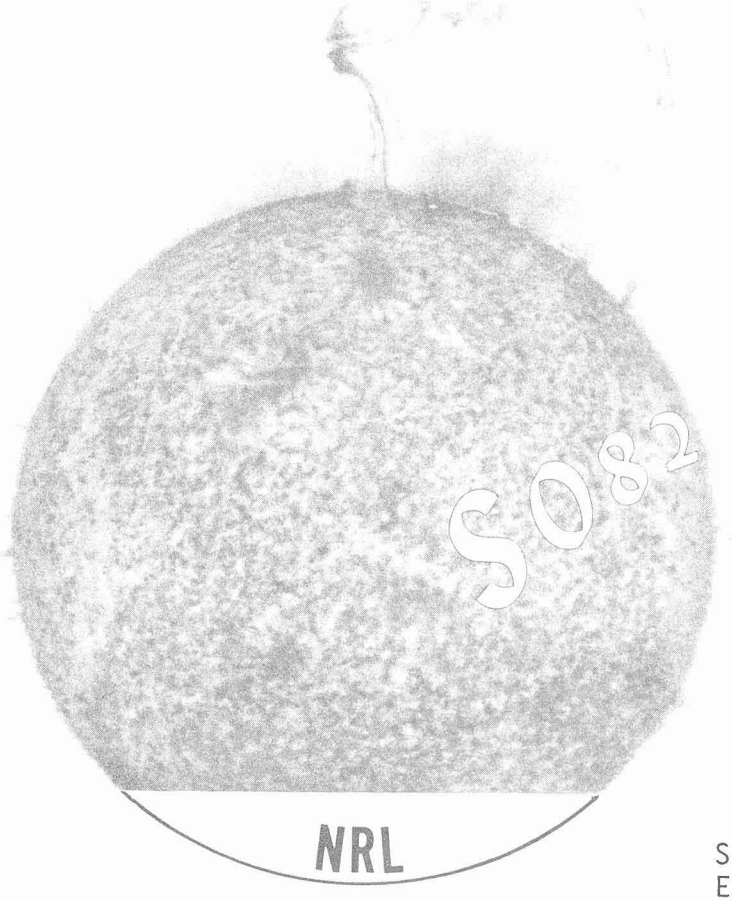
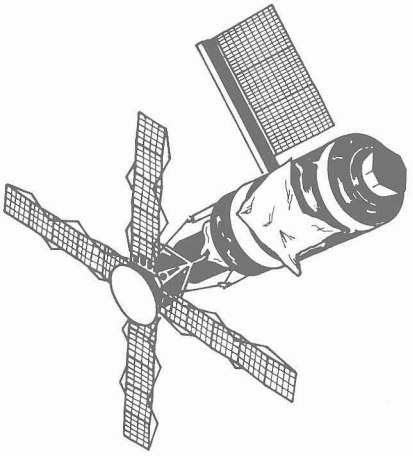
"A" Data Room.

NRL / ATM
MISSION ENGINEERING DATA





S082A SPECTROHELIOGRAPH
EXPOSURES 2A-001 THROUGH 2A-201

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-3

Sequence Log

ATM No.	Film Roll Strip cut	Dev Run
2A001	8-7	3
2A002	8-6	1
2A003	8-5	A
2A004	7-102	1
2A005	7-101	
2A006	7-100	
2A007	7-99	
2A008	7-98	
2A009	7-97	
2A010	7-96	
2A011	7-95	
2A012	7-94	
2A013	7-93	
2A014	7-91	
2A015	7-90	
2A016	7-89	
2A017	7-88	
2A018	7-87	
2A019	7-86	
2A020	7-85	
2A021	7-84	
2A022	7-83	
2A023	7-82	
2A024	7-80	
2A025	7-79	
2A026	7-78	
2A027	7-77	
2A028	7-76	
2A029	7-75	
2A030	7-74	
2A031	7-73	
2A032	7-72	
2A033	7-71	
2A034	7-69	
2A035	7-68	
2A036	7-67	
2A037	7-66	
2A038	7-65	
2A039	7-64	
2A040	7-63	1
2A041	7-62	2
2A042	7-61	
2A043	7-60	
2A044	7-58	
2A045	7-57	
2A046	7-56	
2A047	7-55	
2A048	7-54	
2A049	7-53	
2A050	7-52	

ATM No.	Film Roll Strip cut	Dev Run
2A051	7-51	
2A052	7-50	
2A053	7-49	
2A054	7-47	
2A055	7-46	
2A056	7-45	
2A057	7-44	
2A058	7-43	
2A059	7-42	
2A060	7-41	
2A061	7-40	
2A062	7-39	
2A063	7-38	
2A064	7-37	
2A065	7-35	
2A066	7-34	
2A067	7-33	
2A068	7-32	
2A069	7-31	
2A070	7-30	
2A071	7-29	
2A072	7-28	
2A073	7-27	
2A074	7-25	
2A075	7-24	
2A076	7-23	
2A077	7-22	
2A078	7-21	
2A079	7-20	
2A080	7-19	2
2A081	7-18	3
2A082	7-17	
2A083	7-16	
2A084	7-14	
2A085	7-13	
2A086	7-12	
2A087	7-11	
2A088	7-10	
2A089	7-09	
2A090	7-08	
2A091	7-7	
2A092	7-6	
2A093	7-5	
2A094	8-16	
2A095	8-17	
2A096	8-18	
2A097	8-19	
2A098	8-20	
2A099	8-21	
2A100	8-22	3

ATM No.	Film Roll Strip cut	Dev Run
2A101	8-23	3
2A102	8-24	3
2A103	8-25	5
2A104	8-27	
2A105	8-28	
2A106	8-29	
2A107	8-30	
2A108	8-31	
2A109	8-32	
2A110	8-33	
2A111	8-34	
2A112	8-35	
2A113	8-36	
2A114	8-38	
2A115	8-39	
2A116	8-40	
2A117	8-41	
2A118	8-42	
2A119	8-43	
2A120	8-44	
2A121	8-45	
2A122	8-46	
2A123	8-47	
2A124	8-49	
2A125	8-50	
2A126	8-51	
2A127	8-52	
2A128	8-53	
2A129	8-54	
2A130	8-55	
2A131	8-56	
2A132	8-57	
2A133	8-58	
2A134	8-60	
2A135	8-61	
2A136	8-62	
2A137	8-63	
2A138	8-64	
2A139	8-65	
2A140	8-66	
2A141	8-67	
2A142	8-68	
2A143	8-69	
2A144	8-71	
2A145	8-72	5
2A146	8-73	4
2A147	8-74	
2A148	8-75	
2A149	8-76	
2A150	8-77	

ATM No.	Film Roll Strip cut	Dev Run
2A151	8-78	
2A152	8-79	
2A153	8-80	
2A154	9-5	
2A155	9-6	
2A156	9-7	
2A157	9-8	
2A158	9-9	
2A159	9-10	
2A160	9-11	
2A161	9-12	
2A162	9-13	
2A163	9-14	
2A164	9-16	
2A165	9-17	
2A166	9-18	
2A167	9-19	
2A168	9-20	
2A169	9-21	
2A170	9-22	
2A171	9-23	
2A172	9-24	
2A173	9-25	
2A174	9-27	
2A175	9-28	
2A176	9-29	
2A177	9-30	
2A178	9-31	
2A179	9-32	
2A180	9-33	
2A181	9-34	
2A182	9-35	
2A183	9-36	
2A184	9-38	
2A185	9-39	4
2A186	9-40	3
2A187	9-41	
2A188	9-42	
2A189	9-43	
2A190	9-44	
2A191	9-45	
2A192	9-46	
2A193	9-47	
2A194	9-48	
2A195	9-49	
2A196	8-14	
2A197	8-13	
2A198	8-12	
2A199	8-11	
2A200	8-10	
2A201	8-9	
2A202	8-8	3

Film Data	
Roll No.	Film Type
7	104-06-07
8	104-06-07
9	104-06-07

BALL BROTHERS RESEARCH CORPORATION

BOULDER, COLORADO

NRL/ATM
MISSION ENGINEERING DATA
FOR
S082A SPECTROHELIOGRAPH
EXPOSURES 2A-001 THROUGH 2A-201

620-241 — 22 May 1974
Rev A — 13 May 1975

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

PREPARED

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Project Engineer
Configuration Management

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NRL/ATM Program Manager

FORM BR-72

FOREWORD

The purpose of this document is to provide the camera photographic log, the JSC science console data, and the MSFC engineering data for S082A Film Camera, S/N CM10A-005 (exposure numbers 2A-001 through 2A-201). 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.

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INTRODUCTION

1.0 INTRODUCTION

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

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

Table 1-1

S082A Camera Related Data

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

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

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

Table 1-2
S082B Camera Related Data

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

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

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

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

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

CAMERA AND FILM HISTORY

2.0 CAMERA AND FILM HISTORY

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

2.1 CAMERA IDENTIFICATION AND MISSION USE

Camera:	P/N 36360-501; S/N CM10A-005
Flight:	L/N A2
No. of Film Holders:	Upper 100; Lower 101; Carrier 1
Skylab Mission:	SL-3
Launch Date:	28 July 1973
Installed on Instrument:	6 August 1973
Removed from Instrument:	24 August 1973
Splashdown:	25 September 1973

Significant Remarks:

Camera was launched in Command Module on SL-3, exposed on SL-3 and returned on SL-3.

2.2 ENVIRONMENTAL DATA

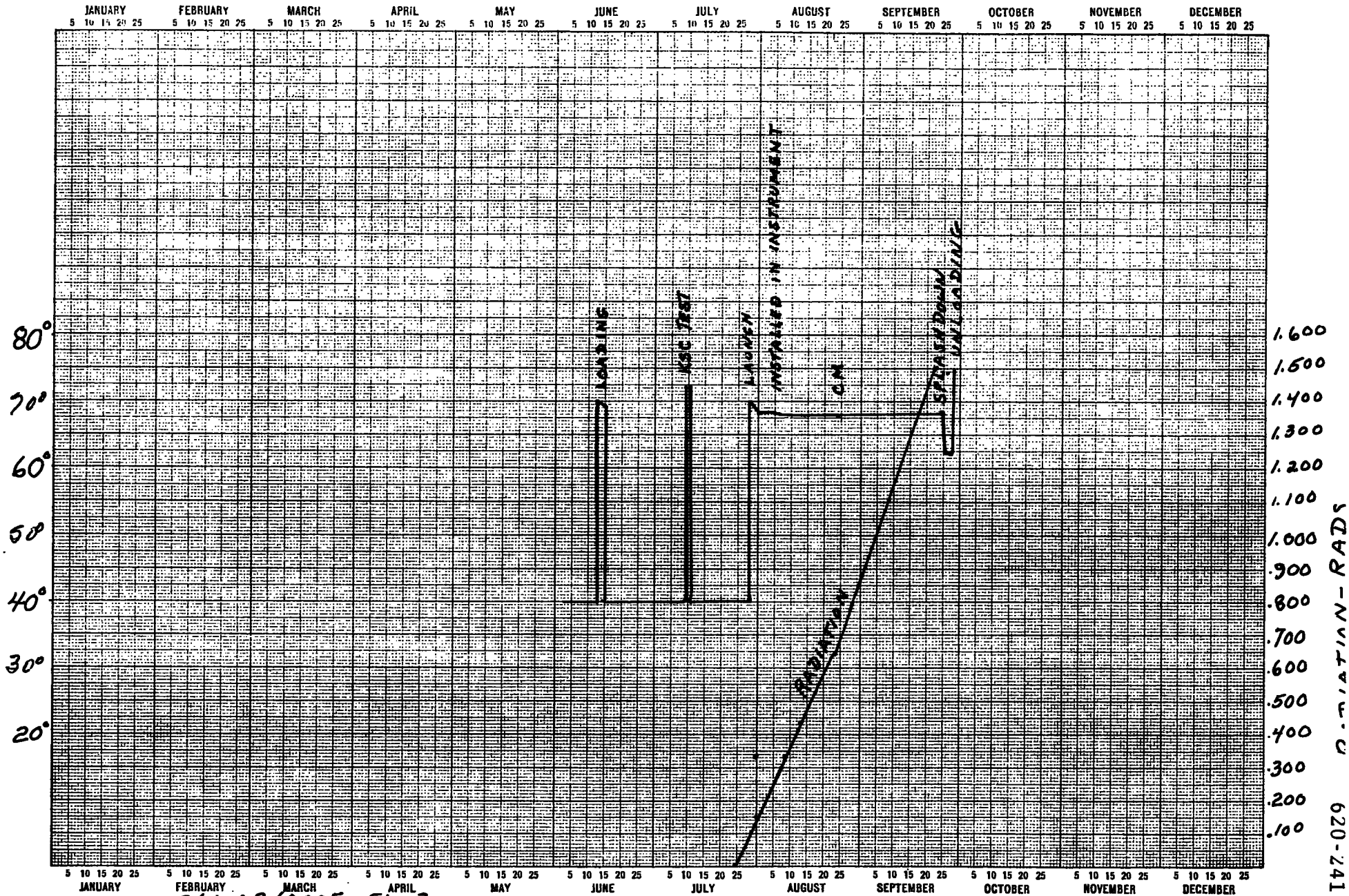
The Environmental Data Section includes a graph of temperature vs day-of-year from loading to unloading of the cameras, and cumulative radiation vs day-of-year for the mission period. These graphs provide a quick look at the environmental parameters to which the film was subjected (See Fig. 2-1). The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

1973



CAMERA S/N A2/A005 SL-3
FILM ROLL # 7-104
8-104
9-104

Figure 2-1. Environmental Parameters

Table 2-1

FILM TRACEABILITY CHART

DATE 3/25/74 CAMERA P/N 36360-501 S/N A2/A005

ROLL NO	CONTROL SAMPLE NO	EXPOSURE NO.	FILM HOLDER NO.
7-1	1		
7-2	2		
7-3	3		
7-4	4		
7-5		2A093	1
7-6		2A092	2
7-7		2A091	3
7-8		2A090	4
7-9		2A089	5
7-10		2A088	6
7-11		2A087	7
7-12		2A086	8
7-13		2A085	9
7-14		2A084	10
7-15	5		
7-16		2A083	11
7-17		2A082	12
7-18		2A081	13
7-19		2A080	14
7-20		2A079	15
7-21		2A078	16
7-22		2A077	17
7-23		2A076	18
7-24		2A075	19
7-25		2A074	20
7-26	6		
7-27		2A073	21
7-28		2A072	22
7-29		2A071	23
7-30		2A070	24
7-31		2A069	25
7-32		2A068	26
7-33		2A067	27
7-34		2A066	28
7-35		2A065	29
7-36	7		
7-37		2A064	30
7-38		2A063	31
7-39		2A062	32
7-40		2A061	33
7-41		2A060	34
7-42		2A059	35
7-43		2A058	36
7-44		2A057	37
7-45		2A056	38
7-46		2A055	39
7-47		2A054	40
7-48	8		
7-49		2A053	41
7-50		2A052	42
7-51		2A051	43
7-52		2A050	44
7-53		2A049	45
7-54		2A048	46
7-55		2A047	47
7-56		2A046	48
7-57		2A045	49
7-58		2A044	50
7-59	9		
7-60		2A043	51
7-61		2A042	52
7-62		2A041	53
7-63		2A040	54
7-64		2A039	55
7-65		2A038	56
7-66		2A037	57
7-67		2A036	58
7-68		2A035	59
7-69		2A034	60
7-70	10		
7-71		2A033	61
7-72		2A032	62
7-73		2A031	63
7-74		2A030	64
7-75		2A029	65
7-76		2A028	66
7-77		2A027	67
7-78		2A026	68
7-79		2A025	69
7-80		2A024	70
7-81	11		
7-82		2A023	71
7-83		2A022	72
7-84		2A021	73
7-85		2A020	74
7-86		2A019	75
7-87		2A018	76
7-88		2A017	77
7-89		2A016	78
7-90		2A015	79
7-91		2A014	80
7-92	12		
7-93		2A013	81
7-94		2A012	82
7-95		2A011	83
7-96		2A010	84
7-97		2A009	85
7-98		2A008	86
7-99		2A007	87
7-100		2A006	88
7-101		2A005	89
7-102		2A004	90
7-103	13		
7-104	14		
8-1	15		
8-2	16		
8-3	17		
8-4	18		
8-5		2A003	91
8-6		2A002	92
8-7		2A001	93
8-8		2A202	94
8-9		2A201	95
8-10		2A200	96
8-11		2A199	97
8-12		2A198	98
8-13		2A197	99
8-14		2A196	100
8-15	19		
8-16		2A094	101
8-17		2A095	102
8-18		2A096	103
8-19		2A097	104
8-20		2A098	105
8-21		2A099	106

ROLL NO.	CONTROL SAMPLE NO.	EXPOSURE NO.	FILM HOLDER NO.
8-22		2A100	107
8-23		2A101	108
8-24		2A102	109
8-25		2A103	110
8-26	20		
8-27		2A104	111
8-28		2A105	112
8-29		2A106	113
8-30		2A107	114
8-31		2A108	115
8-32		2A109	116
8-33		2A110	117
8-34		2A111	118
8-35		2A112	119
8-36		2A113	120
8-37	21		
8-38		2A114	121
8-39		2A115	122
8-40		2A116	123
8-41		2A117	124
8-42		2A118	125
8-43		2A119	126
8-44		2A120	127
8-45		2A121	128
8-46		2A122	129
8-47		2A123	130
8-48	22		
8-49		2A124	131
8-50		2A125	132
8-51		2A126	133
8-52		2A127	134
8-53		2A128	135
8-54		2A129	136
8-55		2A130	137
8-56		2A131	138
8-57		2A132	139
8-58		2A133	140
8-59	23		
8-60		2A134	141
8-61		2A135	142
8-62		2A136	143
8-63		2A137	144
8-64		2A138	145
8-65		2A139	146
8-66		2A140	147
8-67		2A141	148
8-68		2A142	149
8-69		2A143	150
8-70	24		
8-71		2A144	151
8-72		2A145	152
8-73		2A146	153
8-74		2A147	154
8-75		2A148	155
8-76		2A149	156
8-77		2A150	157
8-78		2A151	158
8-79		2A152	159
8-80		2A153	160
8-81	25		
8-82	26		
9-1	27		
9-2	28		
9-3	29		
9-4	30		
9-5		2A154	161
9-6		2A155	162
9-7		2A156	163
9-8		2A157	164
9-9		2A158	165
9-10		2A159	166
9-11		2A160	167
9-12		2A161	168
9-13		2A162	169
9-14		2A163	170
9-15	31		
9-16		2A164	171
9-17		2A165	172
9-18		2A166	173
9-19		2A167	174
9-20		2A168	175
9-21		2A169	176
9-22		2A170	177
9-23		2A171	178
9-24		2A172	179
9-25		2A173	180
9-26	32		
9-27		2A174	181
9-28		2A175	182
9-29		2A176	183
9-30		2A177	184
9-31		2A178	185
9-32		2A179	186
9-33		2A180	187
9-34		2A181	188
9-35		2A182	189
9-36		2A183	190
9-37	33		
9-38		2A184	191
9-39		2A185	192
9-40		2A186	193
9-41		2A187	194
9-42		2A188	195
9-43		2A189	196
9-44		2A190	197
9-45		2A191	198
9-46		2A192	199
9-47		2A193	200
9-48		2A194	201
9-49		2A195	202
9-50	34		
9-51	35		
9-52	36		
9-53	37		
9-54	38		
9-35	39		

FILM DATA	
ROLL NO.	FILM TYPE
7	104-06-07
8	104-06-07
9	104-06-07

Rev A

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.

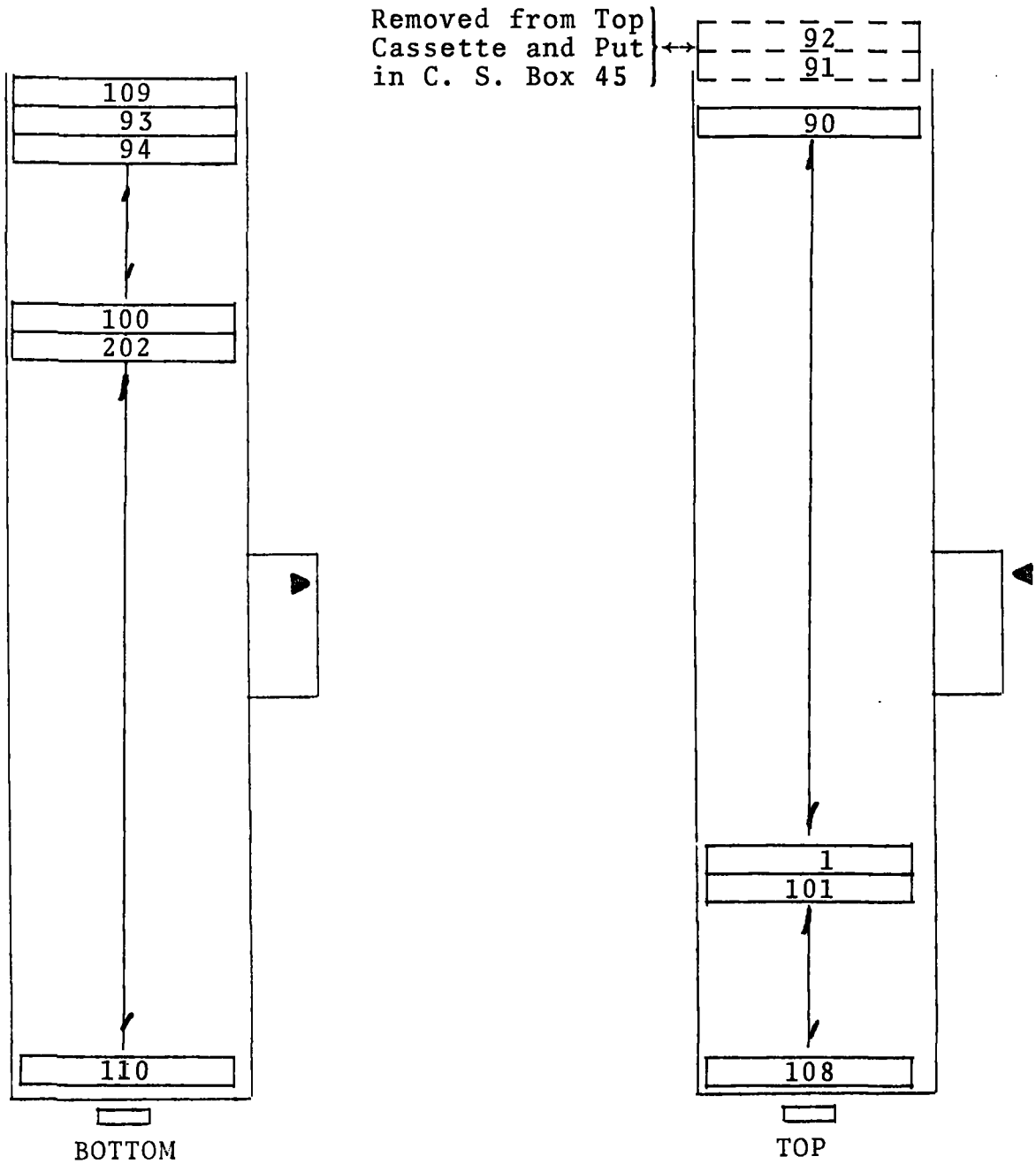
The table (see Table 2-3) entitled "Developing" lists the exposure numbers and development control samples in the order in which they were developed. The development control samples are strips of film cut from the same type of film, although a different roll, to check the developing solutions, process, 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/A005

Date 28 Sep 1973

Table 2-3
Developing

Camera Serial No. CM10A-005
Flight Load No. A-2

Run No.	Exposure Numbers	Dev. Control Sample	Date
	Upper Stack		
A	2A003 2A302 2B002 2B500	MC7-19, 20	10/3/73
1	2A002 2A301 2A004 through 2A040	MC9-6, 7	10/3/73
2	2A041 through 2A080	MC9-8, 9	10/3/73
3	2A081 through 2A101	MC9-10, 11	10/3/73
	Lower Stack		
3	2A102 2A001 2A202 through 2A186		
4	2A185 through 2A146	MC9-12, 13	10/3/73
5	2A145 through 2A103	MC9-14, 15	10/3/73

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 2-17).
- Preflight Transmission Data (see Data Sheet, page 2-18).
- 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)

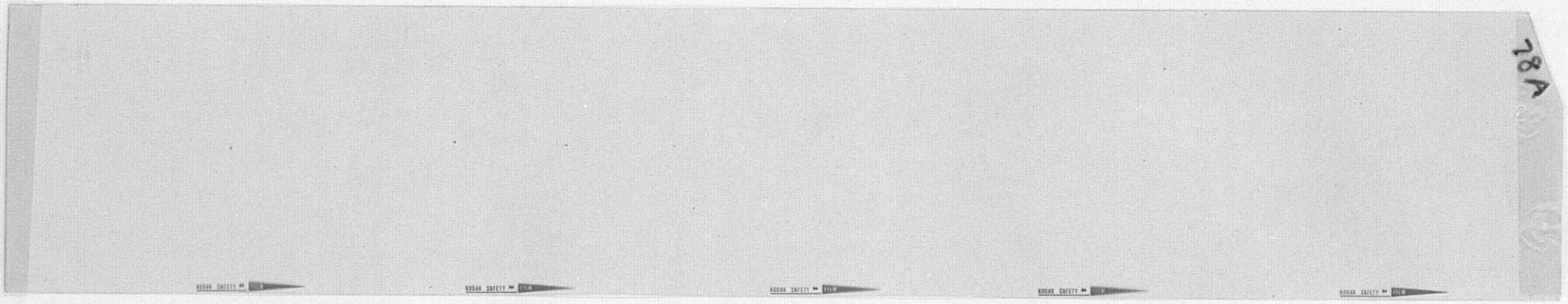
Column 2 Although labelled "ANG. INC." these numbers identify the filters and the position on that filter at which the measurement was made. A key to these numbers is given at the top of each first page.

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:_____

ATM-2-78A

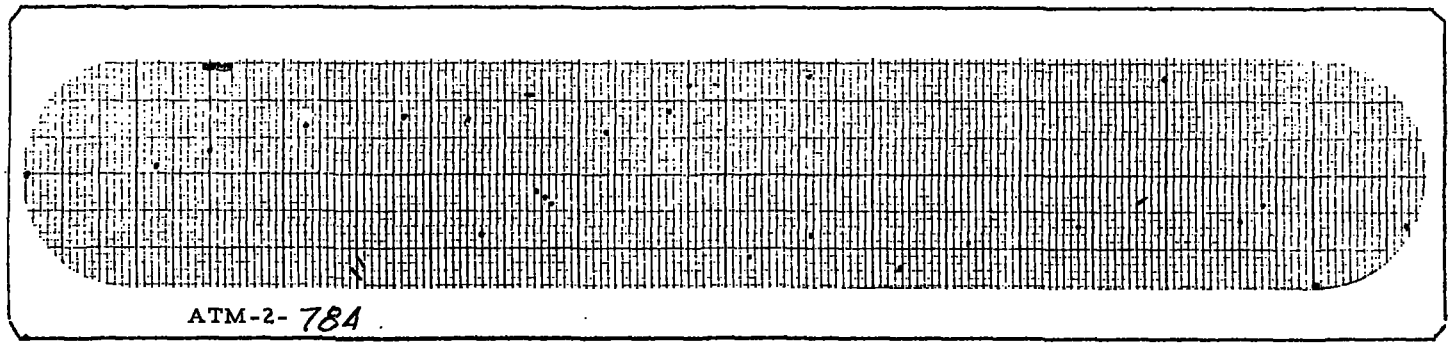
Figure 2-3 Pinhole Fogging Map

Figure 2-4

PINHOLE PLUGGING MAP

Filter I.D. No.: ATM-2-78 A Operator: G. Steele Date: 22 Jan 73

Plug Material: 3022:18/210:180 Lot No.: _____ Exp. Date: _____



ATM-2- 78A

Comments: 2nd grade - no parlodion effect - suitable flight quality on pinhole basis - no breaks or large plugs

ATM FILTER DATA SHEET

FRAME NUMBER ATM-2-78F

1. Frame Data:

Date Received 8-16-72 By LLS

Certification —

Cleaning:

Date 1-15-73 Operator LLS

Wash:

frame cleaning procedure Lot

Aug 72 Lot

Lot

Lot

Bake Temp. 110°C Time 24 HRS

2. Mounting:

Information on separate sheet.

3. Margining:

Date 1-22-73 Time 1130 Operator RE

Width .100"

Epoxy

Epon 828 Lot 3RHJ20 Amount 10.0gm

Versamid 125 Lot 2D4788C Amount 10.0gm

M.K Lot 36782 Amount 160.0gm

4. ~~Prebake Photograph~~ Pin Hole plugging

Date 1-22-73 Operator G.W.S.

5. Cold Cycle:

Date 1-30-73 Operator RE

Time in 0950 Temp. -20°C Time Out 1150

6. Sanitizing Bake:

Date 2-1-73 Operator RWR

Time in 0915 Time out 0915

Temp. 100°C Pressure <100u

7. Pre Environmental Test Photograph:

Date Operator N/A

8. Environmental Testing:

Vibration and acoustic: Date 2-9-73 Carrier R Bowin

Vibration specs. NRL 7149-107 3-10-70

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

9. Post Environmental Test Photograph:

Date 2-14-73 Operator RE

FOIL MOUNTING SHEET

Foil Number 949 Type Al Thickness 1480 Å

Date 1-19-73 Time 1055 Operator RE

Epoxy

Type Epco 210/410 MB LOT 8-24# 1 Amount 20.0gm

Type Epco 180 LOT K2-002 1.1 Amount 3.9gm

Comments:

.010" Squeeze

Frames

1. Type ATM-2 # 78-A Res.
2. Type # Res.
3. Type # Res.
4. Type # Res.
5. Type # Res.
6. Type # Res.
7. Type # Res.
8. Type # Res.
9. Type # Res.
10. Type # Res.
11. Type # Res.
12. Type # Res.
13. Type # Res.
14. Type # Res.
15. Type # Res.
16. Type # Res.

Trim

Date 1-19-73 Time 1500 Operator RE

Comments:

ENVIRONMENTAL TEST

DATE: 2-8-73 SIGMATRON CARRIER: Rachel Bowin

TEST LOCATION: Environmental Laboratory Pt. Mugu

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

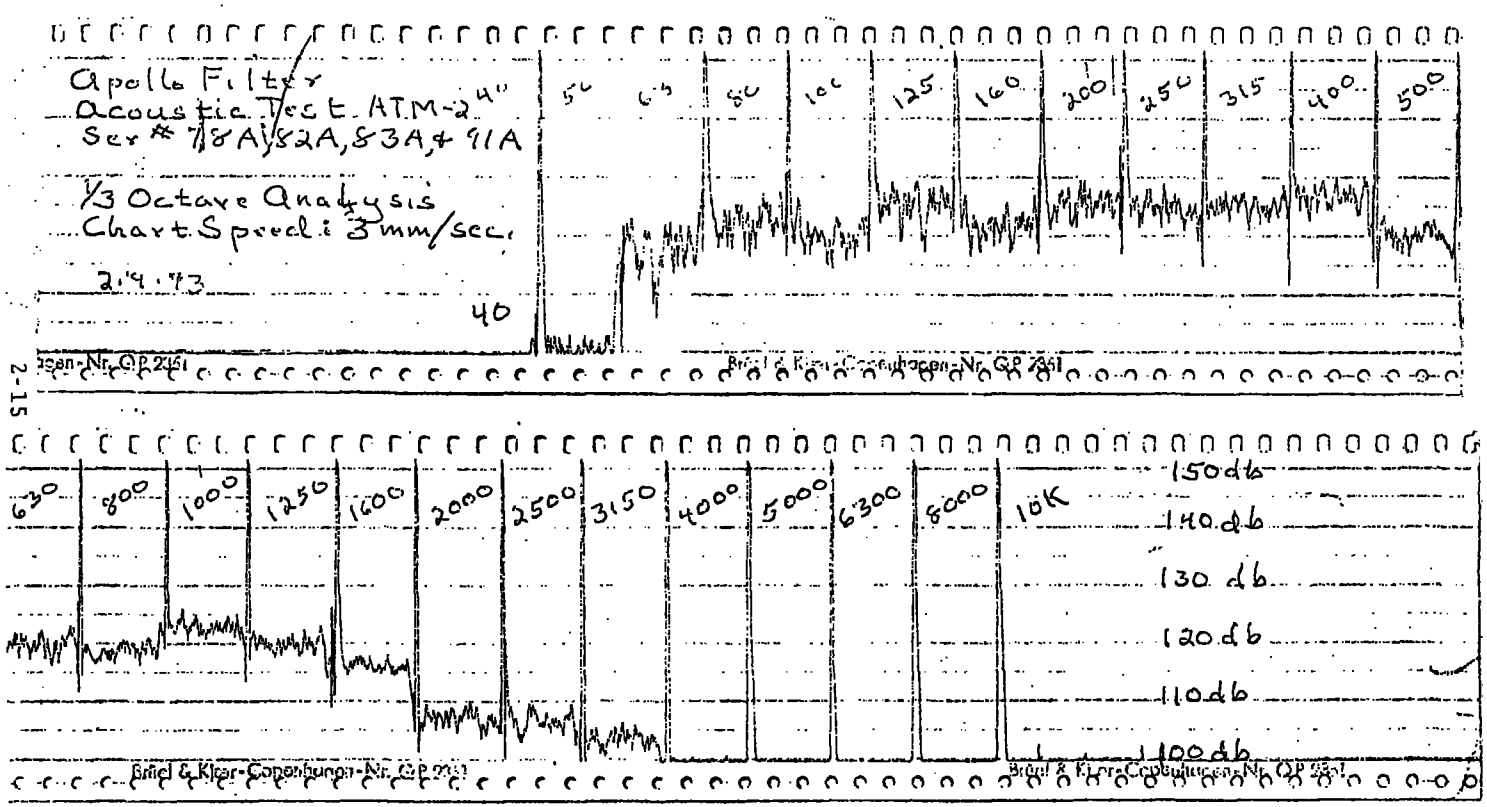
ACOUSTIC TEST: NRL 7149-107 3-10-70

ITEM NO.	FILTER NO.
1	ATM-2-78A
2	ATM-2-82A
3	ATM-2 83-A
4	ATM-2 91-A

COMMENTS:

vibration and acoustics as per programme.

A005


Apollo Filter
Acoustic Test ATM-2
Ser # 78A, 82A, 83A, & 91A
1/3 Octave Analysis
Chart Speed: 3 mm/sec.
2.9.73
40
50
63
80
100
125
160
200
250
315
400
500
630
800
1000
1250
1600
2000
2500
3150
4000
5000
6300
8000
10K
150db
140db
130db
120db
110db
100db
Brüel & Kjær-Copenhagen-Nr. QP 2361

MONITOR 1480 Å RUN 949

620-241

SUBSTRATE

Date 12-7-72 Operator [illegible]

Glass 0211-59-992 Lot N/A

Cleaning method CS(10,10)S(30 min in ultrasonic bath)(30 min in clean rinse bath) water rinse, rinse with conductivity H_2O

Parlodion

Type 3.6 Lot 111672

Quantity 2.5 cc.

Time 1600

Installation

Date 12-15-72 Time 1335 Operator [illegible]

Method Wet Hex for 10 min then strip

SOURCE

Date 12-14 Operator SR 1st (2nd) 3rd Run

Material: Filament lot: 1-730-A Tantalum lot: CC187

lot: AC 170 Si lot: PO 1777 lot: 7

DEPOSITION

		TIME	PRESSURE
Date 12-15 Operator [illegible]			
Pump down ---------- DATE 12-15		1345	—
Bake out: Temp. N/A Time N/A ----------		—	—
Start Ti pump ---------- No. of Runs 2		1545	1.4×10^{-6}
Fill cold trap ----------		1600	6.5×10^{-7}
Fluorescein source on: @ 62 A Warm Optics 25.25		1605	6.4×10^{-7}
Fluorescein run: Lot D4-1-19 Thickness 720Å ------		1633	4.7×10^{-7}
Top SiO source on @ N/A Lot N/A ------		—	—
Bottom SiO source on @ N/A Lot N/A ------		—	—
LN through side plates ----------		1630	5.0×10^{-7}
Ti pump off ----------		1700	9.2×10^{-8}
Source on ----------		1700	9.2×10^{-8}
Run @ 44 ± 1 Set 175		1701	1.2×10^{-6}
Crystal frequency 1.0 to 1.61 Run # 2			
Warm up side plates ---------- 2-16 ----------		1702	3.2×10^{-7}
Substrate Removed ---------- Date 12-18		855	R-D

A005

SCREEN SHEET

Date 12-14-72 Operator RE
Lot 144160 1-1
Lines/Inch MO
Thickness .0006"
Orientation NORMAL

Heat Treatment
Fixture # 3
Date 12-14-72 Operator RE
Temperature 500°C
Time 1HR
Method Vertically suspended with 2 5 Au wires and 445 gm wt.

Comments

Screen Mounting
Fixture # 6
Date 12-18-72 Operator RE
Method Dry Stick/magnetic chuck

Screen Inspection
Date 12-18-72 Operator RE
Comments no breaks

Polyethylene Preparation
Mounting
Cleaning N/A

Spray Cementing
Date 12-18-72 Operator RE / RWR
Cement
Epon Mixture Amount 20cc 7-17-73
Epon 828 Lot 3PH520 3.4%
Chloroform Lot 40942 96.6%

Versamid Mixture Amount 20cc 7-17-73
Versamid 125 Lot 2247BBC 3.4%
Chloroform Lot 40942 96.6%
Date Mixed 12-18-72 Operator LLS

Spraying
Tank Pressure 40 PSI
Fluid Pressure 50
Atomizing Pressure 30
Delta Frequency 320 Hz
Seven Minute Bake Time 1611 - 1618
Pressing Pressure ~~30~~ N/A
Press Fixture Number VACUUM PRESS FIXTURE

Releasing
Remove from press fixture and prepare for release.
Date 12/19/72 Time 1725 Operator RWR

Release Bath
Date 12/19/72 Time 1730 Operator RWR
Solvent Acetone Lot 40896

Remove from release bath and store
Date 12/20/72 Time 1030 Operator RWR
Wash Solvent Acetone Lot 40896
Freon TF Lot 315-11

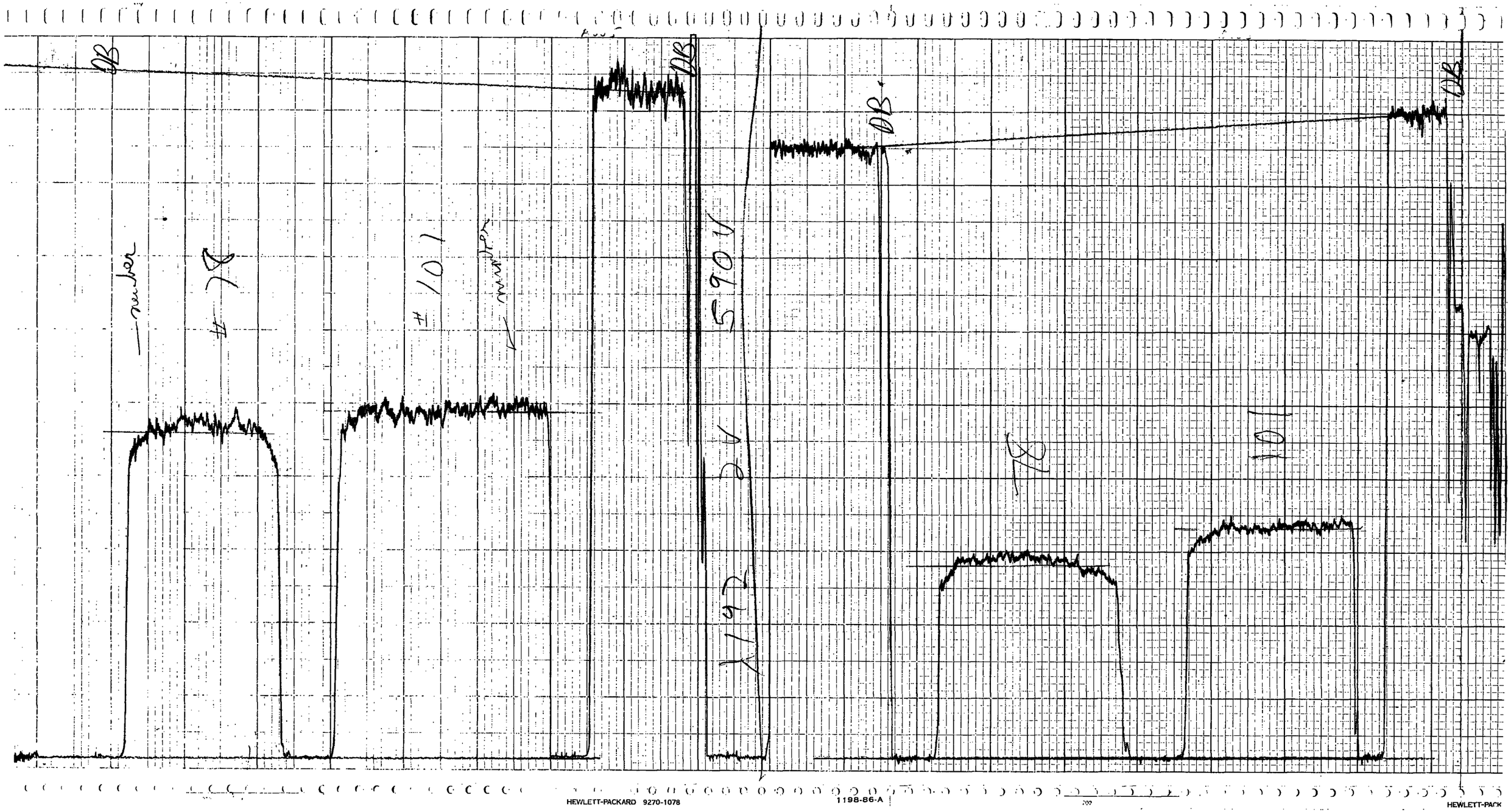
620-241

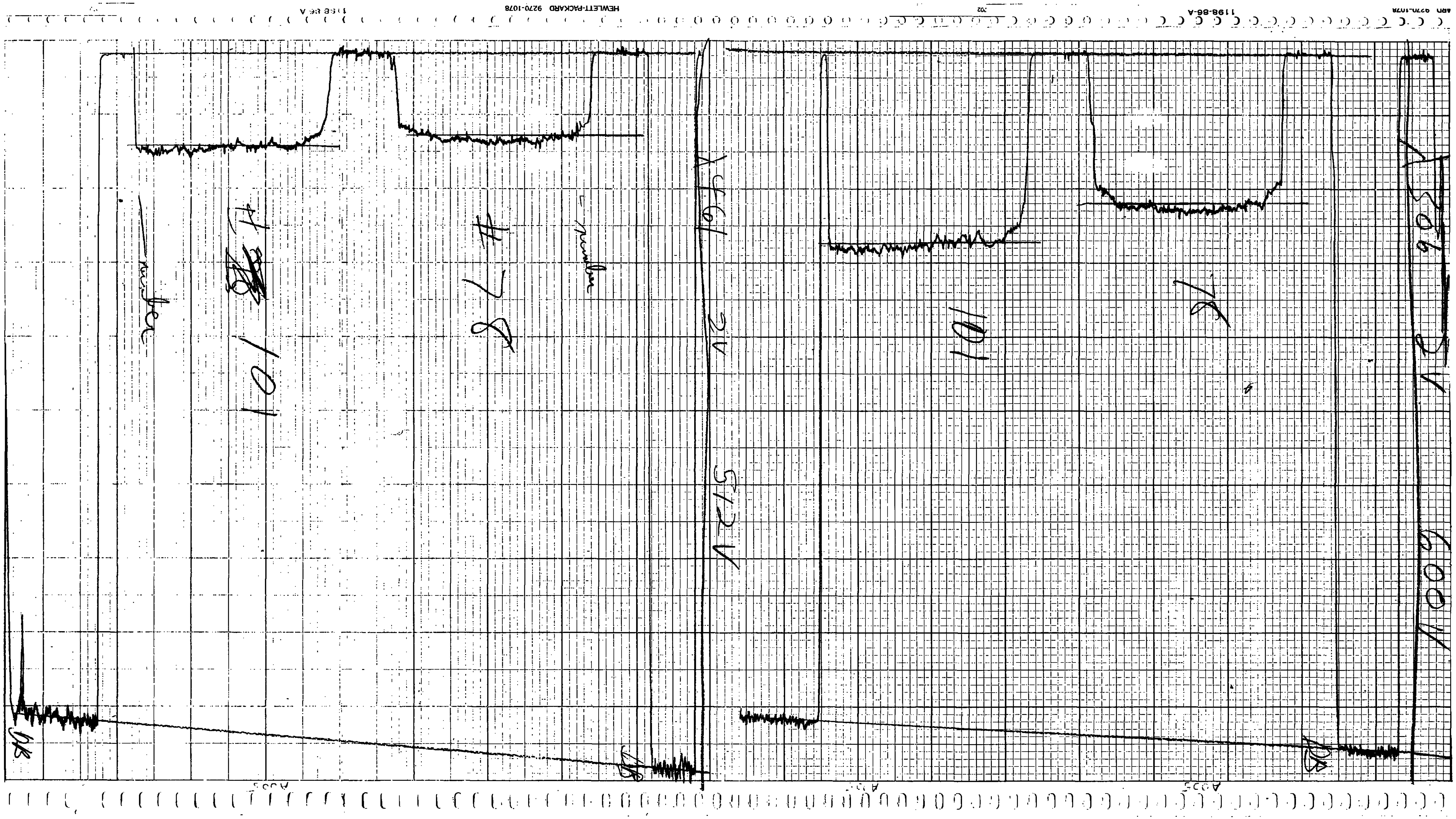
A005

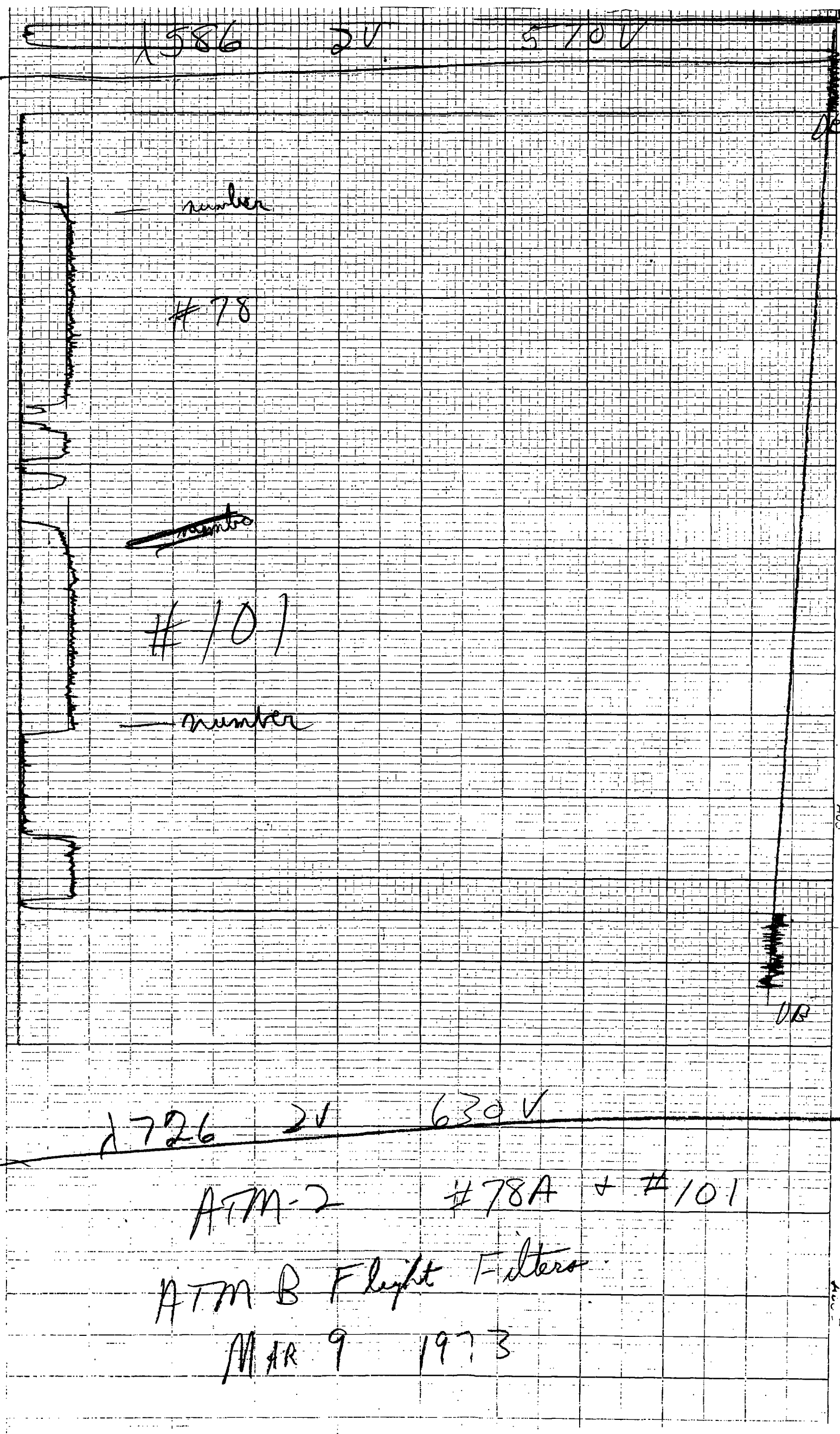
ATM - 2 FILTERS # 78A + 101

FLIGHT MARCH 9 1973 LMG CHART W/ FILTER

λ		78A		101						
192		47.5		51.0						
306		31.0		36.0						
461		220		28.5						
586		11.5		13.5						
726		5.8		6.3						


DB
DB
DB
DB
number
101
number
590 V
HEWLETT-PACKARD 9270-1078
1198-86-A
HEWLETT-PACK





HEWLETT-PACKARD 9270-1078
1198-86-A
HEWLETT-PACKARD 9270-1078

Table 2-4
Post Flight Measurements

10
SL3 ATM-2 FILTERS DWA 31 JAN 1974

FILTER	CAMERA	IDENTIFICATION
ATM-2-78A	A005	11 (END NEAR NUMBER)
		12 (CENTER)
		13 (END AWAY FROM NUMBER)
ATM-2-105	A006	21 (END NEAR NUMBER)
		22 (CENTER)
		23 (END AWAY FROM NUMBER)

VODAR 1P21 + SS 10 KV 35 PPS 200 MICRON SLITS
ARGON LEAK SETTING - .225

WAVE LEN.	ANG. INC.	REFLEC.	PROB. ERR.	PERCENT ERR.	CHEM. SYM
717	13.00	0.0715552	0.0002161	0.30	AL
717	12.00	0.0758609	0.0003121	0.41	AL
717	11.00	0.0715039	0.0002502	0.35	AL
717	21.00	0.0625991	0.0002114	0.34	AL
717	22.00	0.0688636	0.0002352	0.34	AL
717	23.00	0.0673164	0.0001975	0.29	AL
717				V = 530 NCS1	AL
704	13.00	0.0471203	0.0002718	0.58	AL
704	12.00	0.0493533	0.0002499	0.51	AL
704	11.00	0.0467340	0.0002736	0.59	AL
704	21.00	0.0426675	0.0002430	0.57	AL
704	22.00	0.0448729	0.0003348	0.75	AL
704	23.00	0.0439888	0.0002915	0.66	AL
704				V = 540 NCS1	AL
685	13.00	0.0804941	0.0006494	0.81	AL
685	12.00	0.0864832	0.0007619	0.88	AL
685	11.00	0.0800970	0.0008262	1.03	AL
685	21.00	0.0977507	0.0009297	0.95	AL
685	22.00	0.0954141	0.0010061	1.05	AL
685	23.00	0.0906912	0.0010587	1.17	AL
685				V = 610 NCS1	AL
662	13.00	0.1832638	0.0014010	0.76	AL
662	12.00	0.1926786	0.0014414	0.75	AL
662	11.00	0.1789916	0.0012533	0.70	AL
662	21.00	0.1964861	0.0011418	0.58	AL
662	22.00	0.2045756	0.0015976	0.78	AL
662	23.00	0.1988694	0.0014283	0.72	AL
662				V = 660 NCS1	AL
640	13.00	0.1021786	0.0002970	0.29	AL
640	12.00	0.1082426	0.0002401	0.22	AL
640	11.00	0.1029579	0.0002379	0.23	AL
640	21.00	0.0830008	0.0002032	0.24	AL
640	22.00	0.0955914	0.0002539	0.27	AL
640	23.00	0.0935108	0.0002647	0.28	AL
640				V = 530 NCS1	AL

620	13.00	0.0926152	0.0003694	0.40	AL
620	12.00	0.0980587	0.0004272	0.44	AL
620	11.00	0.0937955	0.0003418	0.36	AL
620	21.00	0.0829798	0.0003103	0.37	AL
620	22.00	0.0875199	0.0002594	0.30	AL
620	23.00	0.0842007	0.0003888	0.46	AL
620				V = 530 NCS1	AL
586	13.00	0.1094470	0.0003452	0.32	AL
586	12.00	0.1160632	0.0004058	0.35	AL
586	11.00	0.1064838	0.0003280	0.31	AL
586	21.00	0.1415947	0.0004266	0.30	AL
586	22.00	0.1360947	0.0004255	0.31	AL
586	23.00	0.1291436	0.0003584	0.28	AL
586				V = 510 NCS1	AL
560	13.00	0.1650968	0.0004957	0.30	AL
560	12.00	0.1769669	0.0006230	0.35	AL
560	11.00	0.1678314	0.0003155	0.19	AL
560	21.00	0.1441521	0.0005289	0.37	AL
560	22.00	0.1608160	0.0004584	0.29	AL
560	23.00	0.1601240	0.0005579	0.35	AL
560				V = 544 NCS1	AL
540	13.00	0.1535190	0.0005515	0.36	AL
540	12.00	0.1637256	0.0006974	0.43	AL
540	11.00	0.1550970	0.0006173	0.40	AL
540	21.00	0.1552588	0.0005966	0.38	AL
540	22.00	0.1551678	0.0007284	0.47	AL
540	23.00	0.1513239	0.0005689	0.38	AL
540				V = 553 NCS1	AL
530	13.00	0.1608312	0.0005906	0.37	AL
530	12.00	0.1706618	0.0005253	0.31	AL
530	11.00	0.1592677	0.0005799	0.36	AL
530	21.00	0.1889450	0.0006572	0.35	AL
530	22.00	0.1818311	0.0005278	0.29	AL
530	23.00	0.1733979	0.0006447	0.37	AL
530				V = 500 NCS1	AL
513	13.00	0.1626403	0.0003760	0.23	AL
513	12.00	0.1594045	0.0004962	0.31	AL
513	11.00	0.0605819	0.0002742	0.45	AL
513	21.00	0.1933327	0.0004750	0.25	AL
513	22.00	0.2121945	0.0003725	0.18	AL
513	23.00	0.2098382	0.0005595	0.27	AL
513				V = 510 NCS1	AL
482	13.00	0.2087975	0.0007776	0.37	AL

482	12.00	0.2230767	0.0005371	0.24		AL
482	11.00	0.2133335	0.0008071	0.38		AL
482	21.00	0.2046536	0.0005207	0.25		AL
482	22.00	0.2086449	0.0006362	0.30		AL
482	23.00	0.2046683	0.0005908	0.29		AL
482					V = 485 NCS1	AL
461	13.00	0.2135989	0.0004983	0.23		AL
461	12.00	0.2270600	0.0005707	0.25		AL
461	11.00	0.2143188	0.0004919	0.23		AL
461	21.00	0.2471746	0.0006710	0.27		AL
461	22.00	0.2435342	0.0005925	0.24		AL
461	23.00	0.2346493	0.0006322	0.27		AL
461					V = 464 NCS1	AL
440	13.00	0.2496197	0.0008519	0.34		AL
440	12.00	0.2625369	0.0006005	0.23		AL
440	11.00	0.2476434	0.0007068	0.29		AL
440	21.00	0.2370488	0.0007309	0.31		AL
440	22.00	0.2558282	0.0005500	0.21		AL
440	23.00	0.2506893	0.0006995	0.28		AL
440					V = 548 NCS1	AL
420	13.00	0.2419820	0.0007612	0.31		AL
420	12.00	0.2532601	0.0009260	0.37		AL
420	11.00	0.2435529	0.0006127	0.25		AL
420	21.00	0.2624134	0.0007760	0.30		AL
420	22.00	0.2611346	0.0006885	0.26		AL
420	23.00	0.2538206	0.0005936	0.23		AL
420					V = 555 NCS1	AL
400	13.00	0.2648536	0.0010177	0.38		AL
400	12.00	0.2825343	0.0008375	0.30		AL
400	11.00	0.2640486	0.0008777	0.33		AL
400	21.00	0.2783706	0.0007991	0.29		AL
400	22.00	0.2864761	0.0009491	0.33		AL
400	23.00	0.2800981	0.0011498	0.41		AL
400					V = 605 NCS1	AL
380	13.00	0.2779453	0.0007605	0.27		AL
380	12.00	0.2946221	0.0009735	0.33		AL
380	11.00	0.2784926	0.0007815	0.28		AL
380	21.00	0.2824503	0.0011469	0.41		AL
380	22.00	0.2890074	0.0009266	0.32		AL
380	23.00	0.2806913	0.0009157	0.33		AL
380					V = 619 NCS1	AL
355	13.00	0.2858787	0.0008223	0.29		AL
355	12.00	0.2963223	0.0007950	0.27		AL
355	11.00	0.2806995	0.0011791	0.42		AL
355	21.00	0.2931087	0.0007407	0.25		AL

355	22.00	0.3071161	0.0011267	0.37		AL
355	23.00	0.2990336	0.0011811	0.39		AL
355					V = 632 NCS1	AL
334	13.00	0.2937782	0.0006893	0.23		AL
334	12.00	0.3164244	0.0005467	0.17		AL
334	11.00	0.3011886	0.0005711	0.19		AL
334	21.00	0.3227212	0.0006989	0.22		AL
334	22.00	0.3308156	0.0010484	0.32		AL
334	23.00	0.3210340	0.0008481	0.26		AL
334					V = 542 NCS1	AL
304	13.00	0.3164345	0.0007492	0.24		AL
304	12.00	0.3303441	0.0010994	0.33		AL
304	11.00	0.3145114	0.0008168	0.26		AL
304	21.00	0.3307363	0.0009443	0.29		AL
304	22.00	0.3364415	0.0011132	0.33		AL
304	23.00	0.3281551	0.0008563	0.26		AL
304					V = 602 NCS1	AL
284	13.00	0.3581921	0.0009986	0.28		AL
284	12.00	0.3714347	0.0010054	0.27		AL
284	11.00	0.3560213	0.0009515	0.27		AL
284	21.00	0.3695730	0.0011214	0.30		AL
284	22.00	0.3557579	0.0013450	0.38		AL
284	23.00	0.3475910	0.0011198	0.32		AL
284					V = 522 NCS1	AL
270	13.00	0.3412584	0.0012692	0.37		AL
27(	12.00	0.3529253	0.0015386	0.44		AL
270	11.00	0.3389453	0.0014283	0.42		AL
270	21.00	0.3476656	0.0011056	0.32		AL
270	22.00	0.3704475	0.0014743	0.40		AL
270	23.00	0.3690533	0.0015208	0.41		AL
270					V = 643 NCS1	AL
260	13.00	0.3688307	0.0020613	0.56		AL
260	12.00	0.3901040	0.0018807	0.48		AL
260	11.00	0.3793650	0.0015946	0.42		AL
260	21.00	0.4008475	0.0017528	0.44		AL
260	22.00	0.4089865	0.0019509	0.48		AL
260	23.00	0.3907958	0.0016281	0.42		AL
260					V = 527 NCS1	AL
230	13.00	0.4185258	0.0010771	0.26		AL
230	12.00	0.4362442	0.0011043	0.25		AL
230	11.00	0.4148773	0.0011243	0.27		AL
230	21.00	0.4386430	0.0009947	0.23		AL
230	22.00	0.4509794	0.0012420	0.28		AL
230	23.00	0.4449120	0.0011462	0.26		AL
230					V = 534 NCS1	AL

210	13.00	0.0000000	0.0000000	0.00		AL
210	12.00	0.0000000	0.0000000	0.00		AL
210	11.00	0.0000000	0.0000000	0.00		AL
210	21.00	0.0000000	0.0000000	0.00		AL
210	22.00	0.0000000	0.0000000	0.00		AL
210	23.00	0.0000000	0.0000000	0.00		AL
210					V = 602 NCS1	AL
192	13.00	0.4642884	0.0010571	0.23		AL
192	12.00	0.4895349	0.0011343	0.23		AL
192	11.00	0.4701664	0.0013064	0.28		AL
192	21.00	0.5006096	0.0008906	0.18		AL
192	22.00	0.5127244	0.0013410	0.26		AL
192	23.00	0.4986440	0.0012083	0.24		AL
192					V = 527 NCS1	AL
175	13.00	0.4598340	0.0007473	0.16		AL
175	12.00	0.4760195	0.0009282	0.19		AL
175	11.00	0.4633570	0.0015003	0.32		AL
175	21.00	0.4875144	0.0010457	0.21		AL
175	22.00	0.4965332	0.0008826	0.18		AL
175	23.00	0.4913796	0.0010572	0.22		AL
175					V = 587 NCS1	AL
168	13.00	0.1034976	0.0004992	0.48		AL
168	12.00	0.1086512	0.0004643	0.43		AL
168	11.00	0.1068385	0.0004081	0.38		AL
168	21.00	0.0996193	0.0004642	0.47		AL
168	22.00	0.1062787	0.0003675	0.35		AL
168	23.00	0.1042881	0.0004986	0.48		AL
168					V = 607 NCS1	AL
160	13.00	0.0903288	0.0004391	0.49		AL
160	12.00	0.0966195	0.0004909	0.51		AL
160	11.00	0.0953241	0.0004899	0.51		AL
160	21.00	0.0876550	0.0005773	0.66		AL
160	22.00	0.0948163	0.0004841	0.51		AL
160	23.00	0.0924430	0.0004053	0.44		AL
160					V = 568 NCS1	AL
150	13.00	0.0904126	0.0005001	0.55		AL
150	12.00	0.0947133	0.0005142	0.54		AL
150	11.00	0.0927515	0.0004109	0.44		AL
150	21.00	0.0901846	0.0005119	0.57		AL
150	22.00	0.0957538	0.0004776	0.50		AL
150	23.00	0.0938264	0.0005769	0.61		AL
150					V = 662 NCS1	AL

1

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

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

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

2.6 CAMERA HISTORY

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

Operating Cycles

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

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

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

Table 2-5

S/N A-005

FILM CAMERA LIFE HISTORY

CAMERA SER. NO. A-005

Date	Test Location	Test Description	Nonconf. Rpt No.	Failure Mode	Failure Cause	Failure Corrective Action	Operating Cycles 1	2	3	Type of Lubrication on Failure Area	Environment	Camera Configuration	Remarks
10-21-70 11-05-70	BBRC	Production - Functional (35854)	N/A	N/A			471				Ambient - clean room	23740, Rev AK 36360, Rev B	No significant problems encountered.
11-10-70 11-17-70	BBRC	Production - Incorporated EO's.	N/A	N/A			516				Ambient - clean room	34360, Rev N 23810, Rev Y 34360, Rev S	
11-18-70	BBRC	Production - Recheck of film focal plane (35854)	NMR 25918	Focal plane out-of-spec	Inadequate test fixtures.	Fixtures improved & installed on surface plate. Check deleted from 35854 and put in I&T procedures.	516				Ambient - clean room		Focal plane okay on new set-up.
02-23-71 03-16-71	BBRC	Production - Incorporate retractor mod. & various EO's.	N/A	N/A			968				Ambient - clean room	23810, Rev AD 23740, Rev AG 23812, Rev J 30534, Rev A 30537, Rev C 23788, Rev G	Camera configuration verified to CIL, Rev G on 3-10-71. Re-performed functional test (35854, Rev C).
06-09-71 08-02-71	BBRC	Production - Incorporate bow spring mod. & various EO's.	N/A	N/A			1607				Ambient - clean room	34360, Rev V 22726, Rev D 22721, Rev T 23810, Rev AH 23740, Rev AJ	Microswitch for motor stop is cocked at an angle. Re-performed functional test (35854, Rev C).
08-05-71 10-04-71	BBRC	Production - Incorporate new cam assy & various EO's.	NMR 26890	N/A			1758			Polyimide per BPS 18.07 & burnished MoS_2 per BPS 18.027	Ambient - clean room	23811, Rev L 23810, Rev AM 23823, Rev E 30530, Rev C 23740, Rev AK 29344, Rev E	Lubed corners of all film holders, Part No. 22287, per Rev K. Escapement pawls, Part No. 23751 relubed after visual inpection of all accessible lubricated areas. See NMR.
10-05-71 10-06-71	BBRC	Production - Functional (35854) including thermal vacuum).	NMR 26890	Motor drive went to 2.25 sec instead of 1.9. No film advance on counter.	Motor drive microswitch failed to actuate. Normally closed contacts (non-functional) were cold welded due to apparent break in switch seal. Failure occurred on 90th cy.	Switch replaced. Break in seal at wabble-fram cup may have been result of cocked position of micro switch. (See 6-9-71 entry.)	2161	403	403 (Pawls)		1×10^{-5} torr (200 cy of camera)	Configuration verified to CIL.	

CAMERA SER. NO. A-005

Date	Test Location	Test Description	Nonconf. Rpt No.	Failure Mode	Failure Cause	Failure Corrective Action	Operating Cycles 1	2	3	Type of Lubrication on Failure Area	Environment	Camera Configuration	Remarks
10-05-71 10-06-71													New microswitch position criteria added to adjustment specification 34360.
10-06-71	BBRC	I&T - Pre-Qual (30558)	N/A	N/A			2182	424	403		Ambient - clean room		
10-06-71 10-15-71	BBRC	I&T - Qual Vibration (30559)	NMR 26849	No transport on 67th cy of second film load after vibration. (Escapemnts didn't release carrier)	Escapement mechanism operating margins are apparently not compatible with marginal pawl/ratchet lub conditions.	Due to escapement failure the escapement system was changed to a rolling ratchet design.	2866	1108	1087	Polyimide per BPS 18.07 & burnished MoS_2 per BPS 18.02	Vehicle dynamics & high flow random - 3 axis. High 1 min/axis; Low 4 min/axis.		See NMR 26849 and Engrg Report B5405 71.057 for details.
Revision A dated 2-4-72													
11-17-71 12-02-71	BBRC	Production-Incorporate new escapement design.	NMR 26849	N/A			2866	1108	1087		Ambient - clean room	23740, Rev AP (See CIL, Rev M)	Drive Gear, 23742-1, replaced due to wear condition (probably from vibration). Cam shaft outboard support bearing replaced due to brinelled condition. Feed claw lube looks okay.
12-06-71 12-07-71	BBRC	Production-Functional (35854) including thermal vacuum.	N/A				3396	1638	1638 (cams) 503 (escap)		Ambient - clean room & 1×10^{-5} torr		
12-08-71	BBRC	I&T - Pre-Acceptance (30558)	N/A	N/A			3423				Ambient - clean room		

Date	Test Location	Test Description	Nonconf. Rpt No.	Failure Mode	Failure Cause	Failure Corrective Action	Operating Cycles 1	2	3	Type of Lubrication on Failure Area	Environment	Camera Configuration	Remarks
12-09-71	BBRC	I&T - Vibration (30559)	NMR 26970	Excessive drive time on 57th cy of compliance run.	One extra film holder in upper stack.	Load designation plate put on back of camera to prevent load misinterpretation.	3085				Random Vibration	36360, Rev K	
12-10-71 12-15-71	BBRC	I&T - Thermal Vacuum (30560)	N/A	N/A			3891				1 x 10^{-5} torr		
12-15-71	BBRC	I&T - Post Thermal Vacuum (30561)	N/A	N/A			3904	2146	2146 (Cams) 1011 (Escap)		Ambient - Clean Room		
1-04-72 2-01-72	MSFC	Flight ATM	N/A	N/A			3904				Ambient - Clean Room		
Revision B dated 9 June 1972													
1-19-72 3-24-72	MSFC	S-082A Flt Instrument Alignment Checks	MSFC NR ———	Failed to transport with 15 holders	Unknown - camera returned to BBRC		2900				Ambient - Clean Room		
3-24-72 4-24-72	BBRC	Failure analysis	NMR 27193		Special load of film holders (15 ea. in front of top dummy spacer with no holders behind spacer) permitted spacer interference with shuttle operation.	Special load of 15 holders in field tests discontinued.	2980				Ambient - Clean Room		Back plate springs installed.
4-25-72 4-26-72	BBRC	Supplemental acceptance tests (30561, 30559, 30560 and 30561	NMR 27193				3432				Ambient - Clean Room; X axis random vibration; 1 x 10^{-5} torr vacuum		Camera hand-carried to MSFC.

CAMERA SER. NO. A-005

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

CAMERA SER. NO. A005

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

Type of Lubrication on Failure Area

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

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

DIODE ARRAY DATA

3.0 DIODE ARRAY DATA

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

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

Rev A

DOY	Day of Year
EXP TIME	Duration of Exposure

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

620-241

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

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

March 26, 1974

TO: Distribution

FROM: MO-I/Harvey Golden

SUBJECT: ATMDC Timer Updates

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

ATMDC Timer Updates (Onboard Time)

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

2

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

for Harvey Golden

Enclosure

FILM NR	DATE	DOY	SHUTTER OPEN	CLOSE	EXP TIME	WAVELENGTH
2A 1	AUG 6.73	218	22H 32M 56.75S	33M 16.25S	19.50S	SHORT
2A 2	AUG 7.73	219	14H 3M 41.50S	6M 20.75S	159.25S	LONG
2A 3	AUG 7.73	219	14H 10M 13.75S	10M 23.75S	10.00S	SHORT
2A 4	AUG 7.73	219	15H 44M 24.50S	44M 33.50S	9.00S	SHORT
2A 5	AUG 7.73	219	18H 14M 48.00S	15M 27.00S	39.00S	SHORT
2A 6	AUG 7.73	219	18H 46M 33.75S	47M 53.00S	79.25S	LONG
2A 7	AUG 7.73	219	18H 49M 19.50S	49M 21.75S	2.25S	LONG
2A 8	AUG 7.73	219	19H 59M 41.00S	3M 3.25S	202.25S	SHORT
2A 9	AUG 7.73	219	20H 3M 12.75S	3M 22.50S	9.75S	SHORT
2A 10	AUG 7.73	219	20H 3M 24.50S	4M 4.25S	39.75S	SHORT
2A 11	AUG 7.73	219	20H 4M 6.25S	6M 45.50S	159.25S	SHORT
2A 12	AUG 8.73	220	1H 54M 2.00S	54M 41.75S	39.75S	LONG
2A 13	AUG 8.73	220	1H 55M 47.25S	56M 26.75S	39.50S	SHORT
2A 14	AUG 8.73	220	14H 43M 40.25S	43M 50.00S	9.75S	LONG
2A 15	AUG 8.73	220	14H 46M 4.50S	48M 43.75S	159.25S	LONG
2A 16	AUG 8.73	220	17H 52M 20.75S	53M 0.25S	39.50S	SHORT
2A 17	AUG 8.73	220	20H 32M 0.50S	32M 3.00S	2.50S	SHORT
2A 18	AUG 8.73	220	20H 32M 5.00S	32M 15.00S	10.00S	SHORT
2A 19	AUG 8.73	220	20H 32M 17.00S	32M 56.75S	39.75S	SHORT
2A 20	AUG 9.73	221	1H 10M 28.00S	11M 7.25S	39.25S	SHORT
2A 21	AUG 9.73	221	1H 11M 29.75S	12M 9.25S	39.50S	LONG
2A 22	AUG 9.73	221	15H 20M 31.75S	21M 11.25S	39.50S	SHORT
2A 23	AUG 9.73	221	15H 33M 14.25S	35M 53.25S	159.00S	LONG
2A 24	AUG 9.73	221	15H 46M 7.25S	46M 16.25S	9.00S	SHORT
2A 25	AUG 9.73	221	15H 53M 19.75S	53M 21.50S	1.75S	SHORT
2A 26	AUG 9.73	221	15H 54M 0.25S	54M 2.50S	2.25S	SHORT
2A 27	AUG 9.73	221	15H 54M 4.50S	54M 14.50S	10.00S	SHORT
2A 28	AUG 9.73	221	15H 54M 16.50S	54M 56.25S	39.75S	SHORT
2A 29	AUG 9.73	221	15H 54M 58.25S	55M 3.25S	5.00S	LONG
2A 30	AUG 9.73	221	15H 55M 5.25S	55M 25.00S	19.75S	LONG
2A 31	AUG 9.73	221	15H 55M 27.00S	56M 46.75S	79.75S	LONG
2A 32	AUG 9.73	221	15H 56M 48.75S	56M 51.00S	2.25S	SHORT
2A 33	AUG 9.73	221	15H 56M 53.00S	57M 3.00S	10.00S	SHORT
2A 34	AUG 9.73	221	15H 57M 5.00S	57M 5.50S	0.50S	SHORT
2A 35	AUG 9.73	221	15H 58M 20.00S	58M 59.25S	39.25S	SHORT
2A 36	AUG 9.73	221	19H 49M 17.75S	49M 56.75S	39.00S	SHORT
2A 37	AUG 9.73	221	19H 58M 58.25S	59M 8.25S	10.00S	SHORT
2A 38	AUG 9.73	221	20H 17M 23.75S	18M 2.75S	39.00S	SHORT
2A 39	AUG 9.73	221	20H 33M 48.00S	33M 58.00S	10.00S	SHORT
2A 40	AUG 10.73	222	22H 12M 45.50S	15M 25.00S	159.50S	LONG
2A 41	AUG 10.73	222	22H 16M 54.50S	17M 4.00S	9.50S	SHORT
2A 42	AUG 11.73	223	1H 17M 24.50S	18M 3.50S	39.00S	LONG
2A 43	AUG 11.73	223	1H 18M 41.50S	19M 20.50S	39.00S	SHORT
2A 44	AUG 11.73	223	1H 57M 35.50S	58M 14.50S	39.00S	SHORT
2A 45	AUG 11.73	223	13H 45M 6.00S	47M 45.50S	159.50S	LONG
2A 46	AUG 11.73	223	13H 48M 34.50S	48M 48.50S	14.00S	SHORT
2A 47	AUG 11.73	223	16H 58M 33.75S	58M 36.25S	2.50S	SHORT
2A 48	AUG 11.73	223	16H 58M 38.25S	58M 48.00S	9.75S	SHORT
2A 49	AUG 11.73	223	16H 58M 50.00S	59M 29.75S	39.75S	SHORT
2A 50	AUG 11.73	223	17H 30M 29.25S	31M 48.00S	78.75S	LONG

FILM NR	DATE	DOY	SHUTTER OPEN	CLOSE	EXP TIME	WAVELENGTH
2A 51	AUG 11,73	223	18H 32M 32.75S	33M 51.75S	79.00S	LONG
2A 52	AUG 11,73	223	19H 57M 26.75S	58M 45.50S	78.75S	LONG
2A 53	AUG 11,73	223	20H 3M 4.75S	8M 23.50S	318.75S	LONG
2A 54	AUG 11,73	223	20H 19M 14.00S	20M 33.50S	79.50S	LONG
2A 55	AUG 11,73	223	21H 32M 39.75S	33M 59.25S	79.50S	LONG
2A 56	AUG 11,73	223	21H 59M 32.25S	0M 11.25S	39.00S	SHORT
2A 57	AUG 12,73	224	0H 38M 18.50S	38M 57.25S	38.75S	SHORT
2A 58	AUG 12,73	224	0H 39M 11.00S	39M 50.25S	39.25S	LONG
2A 59	AUG 12,73	224	1H 12M 10.75S	13M 30.25S	79.50S	LONG
2A 60	AUG 12,73	224	23H 4M 59.75S	5M 9.00S	9.25S	SHORT
2A 61	AUG 13,73	225	1H 29M 28.50S	30M 47.50S	79.00S	LONG
2A 62	AUG 13,73	225	1H 32M 53.50S	33M 32.50S	39.00S	SHORT
2A 63	AUG 13,73	225	1H 37M 43.00S	38M 22.50S	39.50S	SHORT
2A 64	AUG 13,73	225	1H 39M 26.50S	40M 45.50S	79.00S	LONG
2A 65	AUG 13,73	225	14H 17M 45.00S	19M 4.00S	79.00S	LONG
2A 66	AUG 13,73	225	14H 19M 34.00S	20M 13.00S	39.00S	SHORT
2A 67	AUG 13,73	225	20H 16M 21.25S	16M 40.00S	18.75S	LONG
2A 68	AUG 13,73	225	20H 20M 25.75S	23M 5.00S	159.25S	LONG
2A 69	AUG 13,73	225	20H 42M 47.25S	42M 56.00S	8.75S	SHORT
2A 70	AUG 13,73	225	20H 45M 41.00S	46M 20.00S	39.00S	SHORT
2A 71	AUG 14,73	226	0H 50M 44.75S	51M 23.50S	38.75S	LONG
2A 72	AUG 14,73	226	0H 51M 46.25S	51M 56.00S	9.75S	SHORT
2A 73	AUG 14,73	226	13H 14M 52.00S	16M 31.50S	99.50S	LONG
2A 74	AUG 14,73	226	13H 19M 21.50S	20M 0.50S	39.00S	SHORT
2A 75	AUG 14,73	226	13H 26M 20.75S	26M 30.50S	9.75S	SHORT
2A 76	AUG 14,73	226	13H 27M 9.00S	28M 48.50S	99.50S	LONG
2A 77	AUG 14,73	226	13H 56M 12.00S	58M 43.25S	151.25S	LONG
2A 78	AUG 14,73	226	19H 23M 33.50S	26M 12.50S	159.00S	LONG
2A 79	AUG 14,73	226	19H 27M 16.25S	29M 55.50S	159.25S	LONG
2A 80	AUG 15,73	227	1H 41M 56.00S	42M 35.50S	39.50S	LONG
2A 81	AUG 15,73	227	1H 43M 26.25S	43M 35.50S	9.25S	SHORT
2A 82	AUG 15,73	227	1H 50M 56.25S	51M 35.50S	39.25S	SHORT
2A 83	AUG 15,73	227	1H 52M 22.75S	52M 42.50S	19.75S	LONG
2A 84	AUG 15,73	227	14H 20M 48.25S	22M 27.75S	99.50S	LONG
2A 85	AUG 15,73	227	14H 23M 34.75S	24M 13.75S	39.00S	SHORT
2A 86	AUG 15,73	227	14H 30M 26.00S	32M 4.75S	98.75S	LONG
2A 87	AUG 15,73	227	15H 40M 24.50S	40M 33.50S	9.00S	SHORT
2A 88	AUG 15,73	227	16H 15M 17.00S	15M 56.50S	39.50S	SHORT
2A 89	AUG 15,73	227	17H 10M 59.00S	11M 8.25S	9.25S	SHORT
2A 90	AUG 15,73	227	17H 54M 23.00S	55M 2.25S	39.25S	SHORT
2A 91	AUG 15,73	227	19H 9M 13.00S	11M 52.00S	159.00S	LONG
2A 92	AUG 15,73	227	19H 31M 30.00S	31M 40.00S	10.00S	SHORT
2A 93	AUG 15,73	227	21H 53M 20.25S	54M 59.50S	99.25S	LONG
2A 94	AUG 15,73	227	21H 57M 41.00S	58M 20.50S	39.50S	SHORT
2A 95	AUG 16,73	228	1H 5M 2.75S	5M 42.00S	39.25S	LONG
2A 96	AUG 16,73	228	1H 6M 10.75S	6M 20.75S	10.00S	SHORT
2A 97	AUG 16,73	228	13H 32M 8.25S	34M 47.50S	159.25S	LONG
2A 98	AUG 16,73	228	13H 35M 43.25S	35M 52.50S	9.25S	SHORT
2A 99	AUG 16,73	228	19H 41M 8.75S	41M 47.75S	39.00S	SHORT
2A100	AUG 17,73	229	1H 51M 14.75S	51M 53.75S	39.00S	LONG

FILM NR	DATE	DOY	SHUTTER OPEN	CLOSE	EXP TIME	WAVELENGTH
2A101	AUG 17,73	229	1H 59M 48.00S	0M 26.75S	38.75S	SHORT
2A102	AUG 17,73	229	11H 33M 9.50S	35M 48.50S	159.00S	LONG
2A103	AUG 17,73	229	11H 36M 29.00S	36M 38.75S	9.75S	SHORT
2A104	AUG 17,73	229	11H 43M 3.75S	43M 43.75S	40.00S	SHORT
2A105	AUG 17,73	229	11H 44M 3.75S	44M 43.75S	40.00S	LONG
2A106	AUG 17,73	229	16H 14M 58.00S	15M 6.75S	8.75S	SHORT
2A107	AUG 17,73	229	16H 16M 28.25S	19M 7.75S	159.50S	LONG
2A108	AUG 17,73	229	17H 26M 29.25S	27M 8.75S	39.50S	SHORT
2A109	AUG 17,73	229	19H 1M 11.75S	1M 50.50S	38.75S	SHORT
2A110	AUG 17,73	229	19H 19M 45.00S	22M 24.25S	159.25S	LONG
2A111	AUG 17,73	229	20H 34M 11.25S	34M 20.25S	9.00S	SHORT
2A112	AUG 17,73	229	20H 51M 34.50S	54M 34.25S	179.75S	SHORT
2A113	AUG 17,73	229	23H 36M 37.50S	37M 16.75S	39.25S	SHORT
2A114	AUG 18,73	230	1H 9M 52.50S	10M 31.50S	39.00S	LONG
2A115	AUG 18,73	230	1H 19M 15.25S	19M 24.50S	9.25S	SHORT
2A116	AUG 18,73	230	1H 21M 31.75S	24M 10.50S	158.75S	LONG
2A117	AUG 18,73	230	12H 2M 36.25S	3M 15.75S	39.50S	SHORT
2A118	AUG 18,73	230	13H 37M 48.00S	37M 57.75S	9.75S	SHORT
2A119	AUG 18,73	230	13H 38M 56.00S	41M 35.50S	159.50S	LONG
2A120	AUG 18,73	230	15H 12M 56.50S	13M 35.25S	38.75S	LONG
2A121	AUG 18,73	230	16H 42M 10.00S	42M 49.00S	39.00S	SHORT
2A122	AUG 18,73	230	18H 15M 52.00S	16M 30.75S	38.75S	LONG
2A123	AUG 18,73	230	19H 48M 51.75S	49M 31.50S	39.75S	SHORT
2A124	AUG 18,73	230	21H 21M 58.00S	24M 37.25S	159.25S	LONG
2A125	AUG 18,73	230	22H 54M 6.75S	54M 46.00S	39.25S	LONG
2A126	AUG 19,73	231	0H 28M 53.00S	29M 32.75S	39.75S	LONG
2A127	AUG 19,73	231	0H 29M 48.50S	30M 27.75S	39.25S	SHORT
2A128	AUG 19,73	231	13H 17M 43.00S	18M 22.00S	39.00S	SHORT
2A129	AUG 19,73	231	13H 38M 29.00S	39M 48.00S	79.00S	LONG
2A130	AUG 19,73	231	15H 57M 34.75S	58M 13.75S	39.00S	SHORT
2A131	AUG 19,73	231	16H 17M 9.00S	17M 48.75S	39.75S	SHORT
2A132	AUG 19,73	231	16H 17M 53.75S	18M 34.00S	40.25S	SHORT
2A133	AUG 19,73	231	16H 18M 38.75S	19M 18.75S	40.00S	SHORT
2A134	AUG 19,73	231	16H 19M 24.25S	20M 4.00S	39.75S	SHORT
2A135	AUG 19,73	231	16H 20M 8.75S	20M 48.75S	40.00S	SHORT
2A136	AUG 19,73	231	16H 20M 54.00S	21M 33.75S	39.75S	SHORT
2A137	AUG 19,73	231	16H 21M 38.75S	22M 18.75S	40.00S	SHORT
2A138	AUG 19,73	231	16H 22M 23.75S	23M 3.75S	40.00S	SHORT
2A139	AUG 19,73	231	16H 23M 9.00S	23M 48.75S	39.75S	SHORT
2A140	AUG 19,73	231	16H 24M 38.75S	25M 18.75S	40.00S	SHORT
2A141	AUG 19,73	231	16H 25M 24.00S	26M 3.75S	39.75S	SHORT
2A142	AUG 19,73	231	16H 26M 8.75S	26M 53.75S	45.00S	SHORT
2A143	AUG 19,73	231	16H 27M 9.00S	27M 48.75S	39.75S	SHORT
2A144	AUG 19,73	231	16H 27M 53.75S	28M 33.50S	39.75S	SHORT
2A145	AUG 19,73	231	16H 28M 38.75S	29M 18.75S	40.00S	SHORT
2A146	AUG 19,73	231	16H 29M 24.00S	30M 3.75S	39.75S	SHORT
2A147	AUG 19,73	231	16H 30M 8.75S	30M 48.50S	39.75S	SHORT
2A148	AUG 19,73	231	16H 39M 30.25S	40M 49.50S	79.25S	LONG
2A149	AUG 19,73	231	19H 10M 9.75S	10M 49.25S	39.50S	SHORT
2A150	AUG 19,73	231	19H 55M 36.50S	56M 56.00S	79.50S	LONG

FILM NR	DATE	DOY	SHUTTER OPEN	CLOSE	EXP TIME	WAVELENGTH
2A151	AUG 19,73	231	22H 15M 9.75S	15M 48.75S	39.00S	SHORT
2A152	AUG 19,73	231	23H 1M 51.75S	3M 10.50S	78.75S	LONG
2A153	AUG 20,73	232	1H 29M 49.25S	30M 28.25S	39.00S	SHORT
2A154	AUG 20,73	232	2H 6M 54.75S	8M 14.25S	79.50S	LONG
2A155	AUG 20,73	232	5H 8M 14.50S	8M 34.25S	19.75S	LONG
2A156	AUG 20,73	232	5H 8M 36.25S	8M 46.25S	10.00S	SHORT
2A157	AUG 20,73	232	5H 8M 48.25S	10M 7.75S	79.50S	LONG
2A158	AUG 20,73	232	5H 10M 9.75S	10M 49.50S	39.75S	SHORT
2A159	AUG 20,73	232	5H 10M 51.75S	16M 10.00S	318.25S	LONG
2A160	AUG 20,73	232	5H 16M 12.25S	18M 51.25S	159.00S	SHORT
2A161	AUG 20,73	232	7H 34M 50.00S	34M 59.75S	9.75S	SHORT
2A162	AUG 20,73	232	7H 35M 2.00S	35M 21.75S	19.75S	LONG
2A163	AUG 20,73	232	7H 35M 23.75S	36M 3.50S	39.75S	SHORT
2A164	AUG 20,73	232	7H 36M 5.50S	37M 25.00S	79.50S	LONG
2A165	AUG 20,73	232	7H 37M 27.25S	40M 6.25S	159.00S	SHORT
2A166	AUG 20,73	232	7H 40M 8.50S	45M 26.75S	318.25S	LONG
2A167	AUG 20,73	232	11H 26M 12.50S	26M 51.25S	38.75S	SHORT
2A168	AUG 20,73	232	12H 35M 21.75S	36M 41.25S	79.50S	LONG
2A169	AUG 20,73	232	13H 51M 19.00S	51M 58.00S	39.00S	SHORT
2A170	AUG 20,73	232	14H 34M 23.25S	35M 42.75S	79.50S	LONG
2A171	AUG 20,73	232	16H 58M 24.50S	59M 3.50S	39.00S	SHORT
2A172	AUG 20,73	232	17H 41M 36.75S	42M 56.25S	79.50S	LONG
2A173	AUG 20,73	232	20H 2M 51.00S	3M 30.00S	39.00S	SHORT
2A174	AUG 20,73	232	20H 48M 58.75S	50M 17.75S	79.00S	LONG
2A175	AUG 20,73	232	23H 12M 23.50S	13M 2.50S	39.00S	SHORT
2A176	AUG 20,73	232	23H 55M 49.25S	57M 8.25S	79.00S	LONG
2A177	AUG 21,73	233	2H 14M 52.50S	15M 32.00S	39.50S	SHORT
2A178	AUG 21,73	233	11H 51M 5.00S	51M 15.00S	10.00S	SHORT
2A179	AUG 21,73	233	11H 51M 17.00S	51M 56.75S	39.75S	SHORT
2A180	AUG 21,73	233	11H 51M 58.75S	54M 38.00S	159.25S	SHORT
2A181	AUG 21,73	233	13H 9M 46.00S	12M 25.00S	159.00S	LONG
2A182	AUG 21,73	233	13H 13M 4.25S	13M 13.00S	8.75S	SHORT
2A183	AUG 21,73	233	14H 42M 38.25S	43M 17.75S	39.50S	SHORT
2A184	AUG 21,73	233	15H 16M 53.00S	17M 31.75S	38.75S	SHORT
2A185	AUG 21,73	233	15H 23M 48.25S	24M 27.75S	39.50S	SHORT
2A186	AUG 21,73	233	15H 29M 35.75S	30M 14.75S	39.00S	SHORT
2A187	AUG 21,73	233	15H 33M 43.50S	34M 22.75S	39.25S	SHORT
2A188	AUG 21,73	233	16H 15M 30.75S	16M 9.50S	38.75S	SHORT
2A189	AUG 21,73	233	16H 58M 59.50S	59M 38.50S	39.00S	SHORT
2A190	AUG 21,73	233	18H 35M 21.50S	38M 0.25S	158.75S	LONG
2A191	AUG 21,73	233	21H 8M 5.25S	10M 44.75S	159.50S	SHORT
2A192	AUG 21,73	233	23H 19M 8.75S	20M 27.50S	78.75S	SHORT
2A193	AUG 22,73	234	1H 36M 58.25S	37M 37.25S	39.00S	SHORT
2A194	AUG 22,73	234	1H 37M 51.25S	38M 30.25S	39.00S	LONG
2A195	AUG 22,73	234	12H 52M 37.25S	55M 16.75S	159.50S	LONG
2A196	AUG 22,73	234	12H 55M 45.75S	55M 54.75S	9.00S	SHORT
2A197	AUG 23,73	235	0H 4M 21.75S	4M 25.75S	4.00S	SHORT
2A198	AUG 23,73	235	0H 55M 42.50S	56M 21.75S	39.25S	SHORT
2A199	AUG 23,73	235	0H 57M 11.75S	57M 50.75S	39.00S	LONG
2A200	AUG 23,73	235	13H 29M 3.25S	31M 42.75S	159.50S	LONG

2A201	AUG 23.73	235	13H 32M 11.75S	32M 20.75S	9.00S	SHORT
2A202	AUG 23.73	235	13H 33M 42.75S	33M 51.75S	9.00S	SHORT

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FILM NR	DATE	DOY	SHUTTER OPEN	CLOSE	EXP TIME	WAVELENGTH
2A 1	AUG 6.73	218	22H 32M 56.75S	33M 16.25S	19.50S	SHORT
2A 2	AUG 7.73	219	14H 3M 41.50S	6M 20.75S	159.25S	LONG
2A 3	AUG 7.73	219	14H 10M 13.75S	10M 23.75S	10.00S	SHORT
2A 4	AUG 7.73	219	15H 44M 24.50S	44M 33.50S	9.00S	SHORT
2A 5	AUG 7.73	219	18H 14M 48.00S	15M 27.00S	39.00S	SHORT
2A 6	AUG 7.73	219	18H 46M 33.75S	47M 53.00S	79.25S	LONG
2A 7	AUG 7.73	219	18H 49M 19.50S	49M 21.75S	2.25S	LONG
2A 8	AUG 7.73	219	19H 59M 41.00S	3M 3.25S	202.25S	SHORT
2A 9	AUG 7.73	219	20H 3M 12.75S	3M 22.50S	9.75S	SHORT
2A 10	AUG 7.73	219	20H 3M 24.50S	4M 4.25S	39.75S	SHORT
2A 11	AUG 7.73	219	20H 4M 6.25S	6M 45.50S	159.25S	SHORT
2A 12	AUG 8.73	220	1H 54M 2.00S	54M 41.75S	39.75S	LONG
2A 13	AUG 8.73	220	1H 55M 47.25S	56M 26.75S	39.50S	SHORT
2A 14	AUG 8.73	220	14H 43M 40.25S	43M 50.00S	9.75S	LONG
2A 15	AUG 8.73	220	14H 46M 4.50S	48M 43.75S	159.25S	LONG
2A 16	AUG 8.73	220	17H 52M 20.75S	53M 0.25S	39.50S	SHORT
2A 17	AUG 8.73	220	20H 32M 0.50S	32M 3.00S	2.50S	SHORT
2A 18	AUG 8.73	220	20H 32M 5.00S	32M 15.00S	10.00S	SHORT
2A 19	AUG 8.73	220	20H 32M 17.00S	32M 56.75S	39.75S	SHORT
2A 20	AUG 9.73	221	1H 10M 28.00S	11M 7.25S	39.25S	SHORT
2A 21	AUG 9.73	221	1H 11M 29.75S	12M 9.25S	39.50S	LONG
2A 22	AUG 9.73	221	15H 20M 31.75S	21M 11.25S	39.50S	SHORT
2A 23	AUG 9.73	221	15H 33M 14.25S	35M 53.25S	159.00S	LONG
2A 24	AUG 9.73	221	15H 46M 7.25S	46M 16.25S	9.00S	SHORT
2A 25	AUG 9.73	221	15H 53M 19.75S	53M 21.50S	1.75S	SHORT
2A 26	AUG 9.73	221	15H 54M 0.25S	54M 2.50S	2.25S	SHORT
2A 27	AUG 9.73	221	15H 54M 4.50S	54M 14.50S	10.00S	SHORT
2A 28	AUG 9.73	221	15H 54M 16.50S	54M 56.25S	39.75S	SHORT
2A 29	AUG 9.73	221	15H 54M 58.25S	55M 3.25S	5.00S	LONG
2A 30	AUG 9.73	221	15H 55M 5.25S	55M 25.00S	19.75S	LONG
2A 31	AUG 9.73	221	15H 55M 27.00S	56M 46.75S	79.75S	LONG
2A 32	AUG 9.73	221	15H 56M 48.75S	56M 51.00S	2.25S	SHORT
2A 33	AUG 9.73	221	15H 56M 53.00S	57M 3.00S	10.00S	SHORT
2A 34	AUG 9.73	221	15H 57M 5.00S	57M 5.50S	0.50S	SHORT
2A 35	AUG 9.73	221	15H 58M 20.00S	58M 59.25S	39.25S	SHORT
2J 36	JUP 9.73	221	198 49M 17=75S	49M 56.75S	39.00S	SHORT
2A 37	AUG 9.73	221	19H 58M 58.25S	59M 8.25S	10.00S	SHORT
2A 38	AUG 9.73	221	20H 17M 23.75S	18M 2.75S	39.00S	SHORT
2A 39	AUG 9.73	221	20H 33M 48.00S	33M 58.00S	10.00S	SHORT
2A 40	AUG 10.73	222	22H 12M 45.50S	15M 25.00S	159.50S	LONG
2A 41	AUG 10.73	222	22H 16M 54.50S	17M 4.00S	9.50S	SHORT
2A 42	AUG 11.73	223	1H 17M 24.50S	18M 3.50S	39.00S	LONG
2A 43	AUG 11.73	223	1H 18M 41.50S	19M 20.50S	39.00S	SHORT
2A 44	AUG 11.73	223	1H 57M 35.50S	58M 14.50S	39.00S	SHORT
2A 45	AUG 11.73	223	13H 45M 6.00S	47M 45.50S	159.50S	LONG
2A 46	AUG 11.73	223	13H 48M 34.50S	48M 48.50S	14.00S	SHORT
2A 47	AUG 11.73	223	16H 58M 33.75S	58M 36.25S	2.50S	SHORT
2A 48	AUG 11.73	223	16H 58M 38.25S	58M 48.00S	9.75S	SHORT
2A 49	AUG 11.73	223	16H 58M 50.00S	59M 29.75S	39.75S	SHORT
2A 50	AUG 11.73	223	17H 30M 29.25S	31M 48.00S	78.75S	LONG

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FILM NR	DATE	DOY	SHUTTER OPEN	CLOSE	EXP TIME	WAVELENGTH
2A 51	AUG 11.73	223	18H 32M 32.75S	33M 51.75S	79.00S	LONG
2A 52	AUG 11.73	223	19H 57M 26.75S	58M 45.50S	78.75S	LONG
2A 53	AUG 11.73	223	20H 3M 4.75S	8M 23.50S	318.75S	LONG
2A 54	AUG 11.73	223	20H 19M 14.00S	20M 33.50S	79.50S	LONG
2A 55	AUG 11.73	223	21H 32M 39.75S	33M 59.25S	79.50S	LONG
2A 56	AUG 11.73	223	21H 59M 32.25S	0M 11.25S	39.00S	SHORT
2A 57	AUG 12.73	224	0H 38M 18.50S	38M 57.25S	38.75S	SHORT
2A 58	AUG 12.73	224	0H 39M 11.00S	39M 50.25S	39.25S	LONG
2A 59	AUG 12.73	224	1H 12M 10.75S	13M 30.25S	79.50S	LONG
2A 60	AUG 12.73	224	23H 4M 59.75S	5M 9.00S	9.25S	SHORT
2A 61	AUG 13.73	225	1H 29M 28.50S	30M 47.50S	79.00S	LONG
2A 62	AUG 13.73	225	1H 32M 53.50S	33M 32.50S	39.00S	SHORT
2A 63	AUG 13.73	225	1H 37M 43.00S	38M 22.50S	39.50S	SHORT
2A 64	AUG 13.73	225	1H 39M 26.50S	40M 45.50S	79.00S	LONG
2A 65	AUG 13.73	225	14H 17M 45.00S	19M 4.00S	79.00S	LONG
2A 66	AUG 13.73	225	14H 19M 34.00S	20M 13.00S	39.00S	SHORT
2A 67	AUG 13.73	225	20H 16M 21.25S	16M 40.00S	18.75S	LONG
2A 68	AUG 13.73	225	20H 20M 25.75S	23M 5.00S	159.25S	LONG
2A 69	AUG 13.73	225	20H 42M 47.25S	42M 56.00S	8.75S	SHORT
2A 70	AUG 13.73	225	20H 45M 41.00S	46M 20.00S	39.00S	SHORT
2A 71	AUG 14.73	226	0H 50M 44.75S	51M 23.50S	38.75S	LONG
2A 72	AUG 14.73	226	0H 51M 46.25S	51M 56.00S	9.75S	SHORT
2A 73	AUG 14.73	226	13H 14M 52.00S	16M 31.50S	99.50S	LONG
2A 74	AUG 14.73	226	13H 19M 21.50S	20M 0.50S	39.00S	SHORT
2A 75	AUG 14.73	226	13H 26M 20.75S	26M 30.50S	9.75S	SHORT
2A 76	AUG 14.73	226	13H 27M 9.00S	28M 48.50S	99.50S	LONG
2A 77	AUG 14.73	226	13H 56M 12.00S	58M 43.25S	151.25S	LONG
2A 78	AUG 14.73	226	19H 23M 33.50S	26M 12.50S	159.00S	LONG
2A 79	AUG 14.73	226	19H 27M 16.25S	29M 55.50S	159.25S	LONG
2A 80	AUG 15.73	227	1H 41M 56.00S	42M 35.50S	39.50S	LONG
2A 81	AUG 15.73	227	1H 43M 26.25S	43M 35.50S	9.25S	SHORT
2A 82	AUG 15.73	227	1H 50M 56.25S	51M 35.50S	39.25S	SHORT
2A 83	AUG 15.73	227	1H 52M 22.75S	52M 42.50S	19.75S	LONG
2A 84	AUG 15.73	227	14H 20M 48.25S	22M 27.75S	99.50S	LONG
2A 85	AUG 15.73	227	14H 23M 34.75S	24M 13.75S	39.00S	SHORT
2A 86	AUG 15.73	227	14H 30M 26.00S	32M 4.75S	98.75S	LONG
2A 87	AUG 15.73	227	15H 40M 24.50S	40M 33.50S	9.00S	SHORT
2A 88	AUG 15.73	227	16H 15M 17.00S	15M 56.50S	39.50S	SHORT
2A 89	AUG 15.73	227	17H 10M 59.00S	11M 8.25S	9.25S	SHORT
2A 90	AUG 15.73	227	17H 54M 23.00S	55M 2.25S	39.25S	SHORT
2A 91	AUG 15.73	227	19H 9M 13.00S	11M 52.00S	159.00S	LONG
2A 92	AUG 15.73	227	19H 31M 30.00S	31M 40.00S	10.00S	SHORT
2A 93	AUG 15.73	227	21H 53M 20.25S	54M 59.50S	99.25S	LONG
2A 94	AUG 15.73	227	21H 57M 41.00S	58M 20.50S	39.50S	SHORT
2A 95	AUG 16.73	228	1H 5M 2.75S	5M 42.00S	39.25S	LONG
2A 96	AUG 16.73	228	1H 6M 10.75S	6M 20.75S	10.00S	SHORT
2A 97	AUG 16.73	228	13H 32M 8.25S	34M 47.50S	159.25S	LONG
2A 98	AUG 16.73	228	13H 35M 43.25S	35M 52.50S	9.25S	SHORT
2A 99	AUG 16.73	228	19H 41M 8.75S	41M 47.75S	39.00S	SHORT
2A100	AUG 17.73	229	1H 51M 14.75S	51M 53.75S	39.00S	LONG

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FILM NR	DATE	DOY	SHUTTER OPEN	CLOSE	EXP TIME	WAVELENGTH
2A101	AUG 17,73	229	1H 59M 48.00S	0M 26.75S	38.75S	SHORT
2A102	AUG 17,73	229	11H 33M 9.50S	35M 48.50S	159.00S	LONG
2A103	AUG 17,73	229	11H 36M 29.00S	36M 38.75S	9.75S	SHORT
2A104	AUG 17,73	229	11H 43M 3.75S	43M 43.75S	40.00S	SHORT
2A105	AUG 17,73	229	11H 44M 3.75S	44M 43.75S	40.00S	LONG
2A106	AUG 17,73	229	16H 14M 58.00S	15M 6.75S	8.75S	SHORT
2A107	AUG 17,73	229	16H 16M 28.25S	19M 7.75S	159.50S	LONG
2A108	AUG 17,73	229	17H 26M 29.25S	27M 8.75S	39.50S	SHORT
2A109	AUG 17,73	229	19H 1M 11.75S	1M 50.50S	38.75S	SHORT
2A110	AUG 17,73	229	19H 19M 45.00S	22M 24.25S	159.25S	LONG
2A111	AUG 17,73	229	20H 34M 11.25S	34M 20.25S	9.00S	SHORT
2A112	AUG 17,73	229	20H 51M 34.50S	54M 34.25S	179.75S	SHORT
2A113	AUG 17,73	229	23H 36M 37.50S	37M 16.75S	39.25S	SHORT
2A114	AUG 18,73	230	1H 9M 52.50S	10M 31.50S	39.00S	LONG
2A115	AUG 18,73	230	1H 19M 15.25S	19M 24.50S	9.25S	SHORT
2A116	AUG 18,73	230	1H 21M 31.75S	24M 10.50S	158.75S	LONG
2A117	AUG 18,73	230	12H 2M 36.25S	3M 15.75S	39.50S	SHORT
2A118	AUG 18,73	230	13H 37M 48.00S	37M 57.75S	9.75S	SHORT
2A119	AUG 18,73	230	13H 38M 56.00S	41M 35.50S	159.50S	LONG
2A120	AUG 18,73	230	15H 12M 56.50S	13M 35.25S	38.75S	LONG
2A121	AUG 18,73	230	16H 42M 10.00S	42M 49.00S	39.00S	SHORT
2A122	AUG 18,73	230	18H 15M 52.00S	16M 30.75S	38.75S	LONG
2A123	AUG 18,73	230	19H 48M 51.75S	49M 31.50S	39.75S	SHORT
2A124	AUG 18,73	230	21H 21M 58.00S	24M 37.25S	159.25S	LONG
2A125	AUG 18,73	230	22H 54M 6.75S	54M 46.00S	39.25S	LONG
2A126	AUG 19,73	231	0H 28M 53.00S	29M 32.75S	39.75S	LONG
2A127	AUG 19,73	231	0H 29M 48.50S	30M 27.75S	39.25S	SHORT
2A128	AUG 19,73	231	13H 17M 43.00S	18M 22.00S	39.00S	SHORT
2A129	AUG 19,73	231	13H 38M 29.00S	39M 48.00S	79.00S	LONG
2A130	AUG 19,73	231	15H 57M 34.75S	58M 13.75S	39.00S	SHORT
2A131	AUG 19,73	231	16H 17M 9.00S	17M 48.75S	39.75S	SHORT
2A132	AUG 19,73	231	16H 17M 53.75S	18M 34.00S	40.25S	SHORT
2A133	AUG 19,73	231	16H 18M 38.75S	19M 18.75S	40.00S	SHORT
2A134	AUG 19,73	231	16H 19M 24.25S	20M 4.00S	39.75S	SHORT
2A135	AUG 19,73	231	16H 20M 8.75S	20M 48.75S	40.00S	SHORT
2A136	AUG 19,73	231	16H 20M 54.00S	21M 33.75S	39.75S	SHORT
2A137	AUG 19,73	231	16H 21M 38.75S	22M 18.75S	40.00S	SHORT
2A138	AUG 19,73	231	16H 22M 23.75S	23M 3.75S	40.00S	SHORT
2A139	AUG 19,73	231	16H 23M 9.00S	23M 48.75S	39.75S	SHORT
2A140	AUG 19,73	231	16H 24M 38.75S	25M 18.75S	40.00S	SHORT
2A141	AUG 19,73	231	16H 25M 24.00S	26M 3.75S	39.75S	SHORT
2A142	AUG 19,73	231	16H 26M 8.75S	26M 53.75S	45.00S	SHORT
2A143	AUG 19,73	231	16H 27M 9.00S	27M 48.75S	39.75S	SHORT
2A144	AUG 19,73	231	16H 27M 53.75S	28M 33.50S	39.75S	SHORT
2A145	AUG 19,73	231	16H 28M 38.75S	29M 18.75S	40.00S	SHORT
2A146	AUG 19,73	231	16H 29M 24.00S	30M 3.75S	39.75S	SHORT
2A147	AUG 19,73	231	16H 30M 8.75S	30M 48.50S	39.75S	SHORT
2A148	AUG 19,73	231	16H 39M 30.25S	40M 49.50S	79.25S	LONG
2A149	AUG 19,73	231	19H 10M 9.75S	10M 49.25S	39.50S	SHORT
2A150	AUG 19,73	231	19H 55M 36.50S	56M 56.00S	79.50S	LONG

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FILM NR	DATE	DOY	SHUTTER OPEN	CLOSE	EXP TIME	WAVELENGTH
2A151	AUG 19,73	231	22H 15M 9.75S	15M 48.75S	39.00S	SHORT
2A152	AUG 19,73	231	23H 1M 51.75S	3M 10.50S	78.75S	LONG
2A153	AUG 20,73	232	1H 29M 49.25S	30M 28.25S	39.00S	SHORT
2A154	AUG 20,73	232	2H 6M 54.75S	8M 14.25S	79.50S	LONG
2A155	AUG 20,73	232	5H 8M 14.50S	8M 34.25S	19.75S	LONG
2A156	AUG 20,73	232	5H 8M 36.25S	8M 46.25S	10.00S	SHORT
2A157	AUG 20,73	232	5H 8M 48.25S	10M 7.75S	79.50S	LONG
2A158	AUG 20,73	232	5H 10M 9.75S	10M 49.50S	39.75S	SHORT
2A159	AUG 20,73	232	5H 10M 51.75S	16M 10.00S	318.25S	LONG
2A160	AUG 20,73	232	5H 16M 12.25S	18M 51.25S	159.00S	SHORT
2A161	AUG 20,73	232	7H 34M 50.00S	34M 59.75S	9.75S	SHORT
2A162	AUG 20,73	232	7H 35M 2.00S	35M 21.75S	19.75S	LONG
2A163	AUG 20,73	232	7H 35M 23.75S	36M 3.50S	39.75S	SHORT
2A164	AUG 20,73	232	7H 36M 5.50S	37M 25.00S	79.50S	LONG
2A165	AUG 20,73	232	7H 37M 27.25S	40M 6.25S	159.00S	SHORT
2A166	AUG 20,73	232	7H 40M 8.50S	45M 26.75S	318.25S	LONG
2A167	AUG 20,73	232	11H 26M 12.50S	26M 51.25S	38.75S	SHORT
2A168	AUG 20,73	232	12H 35M 21.75S	36M 41.25S	79.50S	LONG
2A169	AUG 20,73	232	13H 51M 19.00S	51M 58.00S	39.00S	SHORT
2A170	AUG 20,73	232	14H 34M 23.25S	35M 42.75S	79.50S	LONG
2A171	AUG 20,73	232	16H 58M 24.50S	59M 3.50S	39.00S	SHORT
2A172	AUG 20,73	232	17H 41M 36.75S	42M 56.25S	79.50S	LONG
2A173	AUG 20,73	232	20H 2M 51.00S	3M 30.00S	39.00S	SHORT
2A174	AUG 20,73	232	20H 48M 58.75S	50M 17.75S	79.00S	LONG
2A175	AUG 20,73	232	23H 12M 23.50S	13M 2.50S	39.00S	SHORT
2A176	AUG 20,73	232	23H 55M 49.25S	57M 8.25S	79.00S	LONG
2A177	AUG 21,73	233	2H 14M 52.50S	15M 32.00S	39.50S	SHORT
2A178	AUG 21,73	233	11H 51M 5.00S	51M 15.00S	10.00S	SHORT
2A179	AUG 21,73	233	11H 51M 17.00S	51M 56.75S	39.75S	SHORT
2A180	AUG 21,73	233	11H 51M 58.75S	54M 38.00S	159.25S	SHORT
2A181	AUG 21,73	233	13H 9M 46.00S	12M 25.00S	159.00S	LONG
2A182	AUG 21,73	233	13H 13M 4.25S	13M 13.00S	8.75S	SHORT
2A183	AUG 21,73	233	14H 42M 38.25S	43M 17.75S	39.50S	SHORT
2A184	AUG 21,73	233	15H 16M 53.00S	17M 31.75S	38.75S	SHORT
2A185	AUG 21,73	233	15H 23M 48.25S	24M 27.75S	39.50S	SHORT
2A186	AUG 21,73	233	15H 29M 35.75S	30M 14.75S	39.00S	SHORT
2A187	AUG 21,73	233	15H 33M 43.50S	34M 22.75S	39.25S	SHORT
2A188	AUG 21,73	233	16H 15M 30.75S	16M 9.50S	38.75S	SHORT
2A189	AUG 21,73	233	16H 58M 59.50S	59M 38.50S	39.00S	SHORT
2A190	AUG 21,73	233	18H 35M 21.50S	38M 0.25S	158.75S	LONG
2A191	AUG 21,73	233	21H 8M 5.25S	10M 44.75S	159.50S	SHORT
2A192	AUG 21,73	233	23H 19M 8.75S	20M 27.50S	78.75S	SHORT
2A193	AUG 22,73	234	1H 36M 58.25S	37M 37.25S	39.00S	SHORT
2A194	AUG 22,73	234	1H 37M 51.25S	38M 30.25S	39.00S	LONG
2A195	AUG 22,73	234	12H 52M 37.25S	55M 16.75S	159.50S	LONG
2A196	AUG 22,73	234	12H 55M 45.75S	55M 54.75S	9.00S	SHORT
2A197	AUG 23,73	235	0H 4M 21.75S	4M 25.75S	4.00S	SHORT
2A198	AUG 23,73	235	0H 55M 42.50S	56M 21.75S	39.25S	SHORT
2A199	AUG 23,73	235	0H 57M 11.75S	57M 50.75S	39.00S	LONG
2A200	AUG 23,73	235	13H 29M 3.25S	31M 42.75S	159.50S	LONG
2A201	AUG 23,73	235	13H 32M 11.75S	32M 20.75S	9.00S	SHORT
2A202	AUG 23,73	235	13H 33M 42.75S	33M 51.75S	9.00S	SHORT

4.0 ENGINEERING DATA BOOK - JSC

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

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

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

Rev A

MED Book Glossary

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

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

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

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

DATE	TIME	FILM-STRIP	D/N	JOP-ST	BR	TGT	EXP	WVL
AUG 6	218:22:32	2A-001	147	EVA		UNK	:20	S
AUG 7	219:14:03	2A-002	157	06	01A	SC	2:39	L
AUG 7	219:14:10	2A-003	157	06	01A	SC	:10	S
AUG 7	219:15:44	2A-004	158	02A-6	07B	85	:09	S
AUG 7	219:18:14	2A-005	160	02A-6	07B	85	:39	S
AUG 7	219:18:46	2A-006	160	02A-7	10	85	1:19	L
AUG 7	219:18:49	2A-007	160	02A-7		85	:02.5	L
AUG 7	219:19:59	2A-008	161	02A-2	05	85	3:22	S
AUG 7	219:20:03	2A-009	161	02A-2	05	85	:10	S
AUG 7	219:20:03	2A-010	161	02A-2	05	85	:40	S
AUG 7	219:20:04	2A-011	161	02A-2	05	85	2:39	S
AUG 8	220:01:54	2A-012	165	06 -1	01A	SC	:40	L
AUG 8	220:01:55	2A-013	165	06 -1	01A	SC	:40	S
AUG 8	220:14:43	2A-014	173	06 -1	01A	SC	:10	L
AUG 8	220:14:46	2A-015	173	06 -1	01A	SC	2:39	L
AUG 8	220:17:52	2A-016	175	02A-6	07	85	:40	S
AUG 8	220:20:32	2A-017	177	02A-1	04A	85	:02.5	S
AUG 8	220:20:32	2A-018	177	02A-1	04A	85	:10	S
AUG 8	220:20:32	2A-019	177	02A-1	04A	85	:40	S
AUG 9	221:01:10	2A-020	180	06 -1	01A	SC	:39	S
AUG 9	221:01:11	2A-021	180	06 -1	01A	SC	:40	L
AUG 9	221:15:20	2A-022	189	S02		85	:40	S
AUG 9	221:15:33	2A-023	189	06 -1	01A	SC	2:39	L
AUG 9	221:15:46	2A-024	189	06 -1	01A	SC	:09	S
AUG 9	221:15:53	2A-025	189	03	08	85	:01.5	S
AUG 9	221:15:54	2A-026	189	03	08	85	:02.5	S
AUG 9	221:15:54	2A-027	189	03	08	85	:10	S
AUG 9	221:15:54	2A-028	189	03	08	85	:40	S
AUG 9	221:15:54	2A-029	189	03	08	85	:05	L
AUG 9	221:15:55	2A-030	189	03	08	85	:20	L
AUG 9	221:15:55	2A-031	189	03	08	85	1:20	L
AUG 9	221:15:56	2A-032	189	03	08	85	:02.5	S
AUG 9	221:15:56	2A-033	189	03	08	85	:10	S
AUG 9	221:15:57	2A-034	189	03	08	85	:00.7	S
AUG 9	221:15:58	2A-035	189	S02		UNK	:39	S
AUG 9	221:19:49	2A-036	192	12A-3	26	QR1	:39	S
AUG 9	221:19:58	2A-037	192	12A-3	26	QR1	:10	S
AUG 9	221:20:17	2A-038	192	12A-3	26	QR1	:39	S
AUG 9	221:20:33	2A-039	192	S03		85	:10	S

DATE	TIME	FILM-STRIP	D/N	JOP-ST	BB	TGT	EXP	WVL
AUG 10	222:22:12	2A-040	209	06 -1	01A	SC	2:40	L
AUG 10	222:22:16	2A-041	209	06 -1	01A	SC	:10	S
AUG 11	223:01:17	2A-042	211	06 -1	01A	SC	:39	L
AUG 11	223:01:18	2A-043	211	06 -1	01A	SC	:39	S
AUG 11	223:01:57	2A-044	211	02A-6	07B	85	:39	S
AUG 11	223:13:45	2A-045	219	06 -1	01A	SC	2:40	L
AUG 11	223:13:48	2A-046	219	06 -1	01A	SC	:14	S
AUG 11	223:16:58	2A-047	221	02C-2	05	85	:02.5	S
AUG 11	223:16:58	2A-048	221	02C-2	05	85	:10	S
AUG 11	223:16:58	2A-049	221	02C-2	05	85	:40	S
AUG 11	223:17:30	2A-050	221	02C-1	02	SC	1:19	L
AUG 11	223:18:32	2A-051	222	02C-5	13	85	1:19	L
AUG 11	223:19:57	2A-052	223	02C-5	13	85	1:19	L
AUG 11	223:20:03	2A-053	223	02C-5	13	85	5:19	L
AUG 11	223:20:19	2A-054	223	02C-5	13	85	1:20	L
AUG 11	223:21:32	2A-055	224	02C-5	13	85	1:20	L
AUG 11	223:21:59	2A-056	224	02C-5	13	85	:39	S
AUG 12	224:00:38	2A-057	226	06 -1	01A	SC	:39	S
AUG 12	224:00:39	2A-058	226	06 -1	01A	SC	:39	L
AUG 12	224:01:12	2A-059	226	02C-4	36A	85	1:20	L
AUG 12	224:23:04	2A-060	240	02C-1	02	SC	:09	S
AUG 13	225:01:29	2A-061	242	06 -1	01A	SC	1:19	L
AUG 13	225:01:32	2A-062	242	06 -1	01A	SC	:39	S
AUG 13	225:01:37	2A-063	242	06 -1	01A	SC	:40	S
AUG 13	225:01:39	2A-064	242	06 -1	01A	SC	1:19	L
AUG 13	225:14:17	2A-065	250	06 -1	01A	SC	1:19	L
AUG 13	225:14:19	2A-066	250	06 -1	01A	SC	:39	S
AUG 13	225:20:16	2A-067	254	04B-2	36A	F28	:19	L
AUG 13	225:20:20	2A-068	254	04B-2	36A	F28	2:39	L
AUG 13	225:20:42	2A-069	254	01A-1	33A	NC1	:09	S
AUG 13	225:20:45	2A-070	254	01A-1	33A	NC1	:39	S
AUG 14	226:00:50	2A-071	257	06 -1	01A	SC	:39	L
AUG 14	226:00:51	2A-072	257	06 -1	01A	SC	:10	S
AUG 14	226:13:14	2A-073	265	06 -1	01A	SC	1:40	L
AUG 14	226:13:19	2A-074	265	06 -1	01A	SC	:39	S
AUG 14	226:13:26	2A-075	265	06 -1	01A	SC	:10	S
AUG 14	226:13:27	2A-076	265	06 -1	01A	SC	1:40	L
AUG 14	226:13:56	2A-077	265	04A-4	11	P29	2:31	L
AUG 14	226:19:23	2A-078	269	05B-1	02	SC	2:39	L

DATE	TIME	FILM-STRIP	D/N	JOP-ST	BB	TGT	EXP	WVL
AUG 14	226:19:27	2A-079	269	05B-1	02	SC	2:39	L
AUG 15	227:01:41	2A-080	273	06 -1	01A	SC	:40	L
AUG 15	227:01:43	2A-081	273	06 -1	01A	SC	:09	S
AUG 15	227:01:50	2A-082	273	06 -1	01B	SC	:39	S
AUG 15	227:01:52	2A-083	273	06 -1	01B	SC	:19	L
AUG 15	227:14:20	2A-084	281	06 -1	01A	SC	1:40	L
AUG 15	227:14:23	2A-085	281	06 -1	01A	SC	:39	S
AUG 15	227:14:30	2A-086	281	06 -1	01B	SC	1:39	L
AUG 15	227:15:40	2A-087	282	11 -2	10	90	:09	S
AUG 15	227:16:15	2A-088	282	11 -5	10	90	:40	S
AUG 15	227:17:10	2A-089	283	11 -2	10	QR1	:09	S
AUG 15	227:17:54	2A-090	283	11 -5	10	QR1	:39	S
AUG 15	227:19:09	2A-091	284	06 -2	02	SC	2:39	L
AUG 15	227:19:31	2A-092	284	2A -6	07	90	:10	S
AUG 15	227:21:53	2A-093	286	17A-6	36	BS1	1:39	L
AUG 15	227:21:57	2A-094	286	17A-6	36	BS1	:40	S
AUG 16	228:01:05	2A-095	288	06 -1	01A	SC	:39	L
AUG 16	228:01:06	2A-096	288	06 -1	01A	SC	:10	S
AUG 16	228:13:32	2A-097	296	06 -1	01A	SC	2:39	L
AUG 16	228:13:35	2A-098	296	06 -1	01A	SC	:09	S
AUG 16	228:19:41	2A-099	300	04A-1	02	SC	:39	S
AUG 17	229:01:51	2A-100	304	06 -1	01B	SC	:39	L
AUG 17	229:01:59	2A-101	304	06 -1	01B	SC	:39	S
AUG 17	229:11:33	2A-102	310	06 -1	01A	SC	2:39	L
AUG 17	229:11:36	2A-103	310	06 -1	01A	SC	:10	S
AUG 17	229:11:43	2A-104	310	06 -1	01B	SC	:40	S
AUG 17	229:11:44	2A-105	310	06 -1	01B	SC	:40	L
AUG 17	229:16:14	2A-106	313	01B-1	33	NC1	:09	S
AUG 17	229:16:16	2A-107	313	01B-1	33	NC1	2:40	L
AUG 17	229:17:26	2A-108	314	06 -2	02	SC	:40	S
AUG 17	229:19:01	2A-109	315	05A-4	13	LS5	:39	S
AUG 17	229:19:19	2A-110	315	05A-4	13	LS5	2:40	L
AUG 17	229:20:34	2A-111	316	09 -1	02	SC	:09	S
AUG 17	229:20:51	2A-112	316	09 -2	28	86	3:00	S
AUG 17	229:23:36	2A-113	318	09 -1	02	SC	:39	S
AUG 18	230:01:09	2A-114	319	06 -1	01A	SC	:39	L
AUG 18	230:01:19	2A-115	319	06 -1	01B	SC	:09	S
AUG 18	230:01:21	2A-116	319	06 -1	01B	SC	2:39	L
AUG 18	230:12:02	2A-117	326	09 -1	02	SC	:40	S

DATE	TIME	FILM-STRIP	D/N	JOP-ST	BB	TGT	EXP	WVL
AUG 18	230:13:37	2A-118	327	06 -1	01A	SC	:10	S
AUG 18	230:13:39	2A-119	327	06 -1	01A	SC	2:40	L
AUG 18	230:15:12	2A-120	328	09 -1	02	SC	:39	L
AUG 18	230:16:42	2A-121	329	09 -1	02	SC	:39	S
AUG 18	230:18:15	2A-122	330	09 -1	02	SC	:39	L
AUG 18	230:19:48	2A-123	331	09 -1	02	SC	:40	S
AUG 18	230:21:21	2A-124	332	09 -1	02	SC	2:39	L
AUG 18	230:22:54	2A-125	333	09 -1	02	SC	:39	L
AUG 19	231:00:28	2A-126	334	06 -1	01A	SC	:40	L
AUG 19	231:00:29	2A-127	334	06 -1	01A	SC	:39	S
AUG 19	231:13:17	2A-128	342	06 -1	01B	SC	:39	S
AUG 19	231:13:38	2A-129	342	06 -1	02	SC	1:19	L
AUG 19	231:15:57	2A-130	344	09 -1	02	SC	:39	S
AUG 19	231:16:17	2A-131	344	11 -3	18	SC	:40	S
AUG 19	231:16:17	2A-132	344	11 -3	18	SC	:40	S
AUG 19	231:16:18	2A-133	344	11 -3	18	SC	:40	S
AUG 19	231:16:19	2A-134	344	11 -3	18	SC	:40	S
AUG 19	231:16:20	2A-135	344	11 -3	18	SC	:40	S
AUG 19	231:16:20	2A-136	344	11 -3	18	SC	:40	S
AUG 19	231:16:21	2A-137	344	11 -3	18	SC	:40	S
AUG 19	231:16:22	2A-138	344	11 -3	18	SC	:40	S
AUG 19	231:16:23	2A-139	344	11 -3	18	SC	:40	S
AUG 19	231:16:24	2A-140	344	11 -3	18	SC	:40	S
AUG 19	231:16:25	2A-141	344	11 -3	18	SC	:40	S
AUG 19	231:16:26	2A-142	344	11 -3	18	SC	:40	S
AUG 19	231:16:27	2A-143	344	11 -3	18	SC	:40	S
AUG 19	231:16:27	2A-144	344	11 -3	18	SC	:40	S
AUG 19	231:16:28	2A-145	344	11 -3	18	SC	:40	S
AUG 19	231:16:29	2A-146	344	11 -3	18	SC	:40	S
AUG 19	231:16:30	2A-147	344	11 -3	18	SC	:40	S
AUG 19	231:16:39	2A-148	344	09 -1	02	SC	1:19	L
AUG 19	231:19:10	2A-149	345	09 -1	02	SC	:40	S
AUG 19	231:19:55	2A-150	345	09 -1	02	SC	1:20	L
AUG 19	231:22:15	2A-151	348	09 -1	02	SC	:39	S
AUG 19	231:23:01	2A-152	348	09 -1	02	SC	2:39	L
AUG 20	232:01:29	2A-153	350	09 -1	02	SC	:39	S
AUG 20	232:02:06	2A-154	350	09 -1	02	SC	1:20	L
AUG 20	232:05:08	2A-155	352	UNA		SC	:20	L
AUG 20	232:05:08	2A-156	352	UNA		SC	:10	S

DATE	TIME	FILM-STRIP	D/N	JOP-ST	RR	TGT	EXP	WVL
AUG 20	232:05:08	2A-157	352	UNA		SC	1:20	L
AUG 20	232:05:10	2A-158	352	UNA		SC	:40	S
AUG 20	232:05:10	2A-159	352	UNA		SC	5:18	L
AUG 20	232:05:16	2A-160	352	UNA		SC	2:39	S
AUG 20	232:07:34	2A-161	354	UNA		SC	:10	S
AUG 20	232:07:35	2A-162	354	UNA		SC	:20	L
AUG 20	232:07:35	2A-163	354	UNA		SC	:40	S
AUG 20	232:07:36	2A-164	354	UNA		SC	1:20	L
AUG 20	232:07:37	2A-165	354	UNA		SC	2:39	S
AUG 20	232:07:40	2A-166	354	UNA		SC	5:18	L
AUG 20	232:11:26	2A-167	356	09 -1	02	SC	:39	S
AUG 20	232:12:35	2A-168	357	06 -1	01	SC	1:20	L
AUG 20	232:13:51	2A-169	358	09 -1	02	SC	:39	S
AUG 20	232:14:34	2A-170	358	09 -1	02	SC	1:20	L
AUG 20	232:16:58	2A-171	360	09 -1	02	SC	:39	S
AUG 20	232:17:41	2A-172	360	09 -1	02	SC	1:20	L
AUG 20	232:20:02	2A-173	362	09 -1	02	SC	:39	S
AUG 20	232:20:48	2A-174	362	09 -1	02	SC	1:19	L
AUG 20	232:23:12	2A-175	364	09 -1	02	SC	:39	S
AUG 20	232:23:55	2A-176	364	09 -1	02	SC	1:19	L
AUG 21	233:02:14	2A-177	366	09 -1	02	SC	:40	S
AUG 21	233:11:51	2A-178	372	02B-2	05	93	:10	S
AUG 21	233:11:51	2A-179	372	02B-2	05	93	:40	S
AUG 21	233:11:51	2A-180	372	02B-2	05	93	2:40	S
AUG 21	233:13:09	2A-181	373	06 -1	01A	SC	2:40	L
AUG 21	233:13:13	2A-182	373	06 -1	01A	SC	:09	S
AUG 21	233:14:42	2A-183	374	09 -1	02	SC	:40	S
AUG 21	233:15:16	2A-184	374	01D-2	11	NC1	:40	S
AUG 21	233:15:23	2A-185	374	01D-2	11	NC1	:40	S
AUG 21	233:15:29	2A-186	374	01D-2	11	NC1	:39	S
AUG 21	233:15:33	2A-187	374	01D-2	11	NC1	:39	S
AUG 21	233:16:15	2A-188	375	OBS	02	P47	:39	S
AUG 21	233:16:58	2A-189	375	OBS	02	P47	:39	S
AUG 21	233:18:35	2A-190	376	06 -2	02	SC	2:39	L
AUG 21	233:21:08	2A-191	378	06 -2	02	SC	2:40	S
AUG 21	233:23:19	2A-192	379	06 -2	02	LB	1:19	S
AUG 22	234:01:36	2A-193	381	06 -1	01A	SC	:39	S
AUG 22	234:01:37	2A-194	381	06 -1	01B	SC	:39	L
AUG 22	234:12:52	2A-195	388	06 -1	01A	SC	2:39	L

DATE	TIME	FILM-STRIP	D/N	JOP-ST	BP	TGT	EXP	WVL
AUG 22	234:12:55	2A-196	388	06 -1	01A	SC	:09	S
AUG 23	235:00:04	2A-197	395	S16		LB	:04	S
AUG 23	235:00:55	2A-198	396	06 -1	01A	SC	:39	S
AUG 23	235:00:57	2A-199	396	06 -1	01A	SC	:39	L
AUG 23	235:13:29	2A-200	404	S06	01A	SC	2:40	L
AUG 23	235:13:32	2A-201	404	S06	01A	SC	:09	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.

S082A EDB PRINTOUT INDEX
Page 2

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

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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).

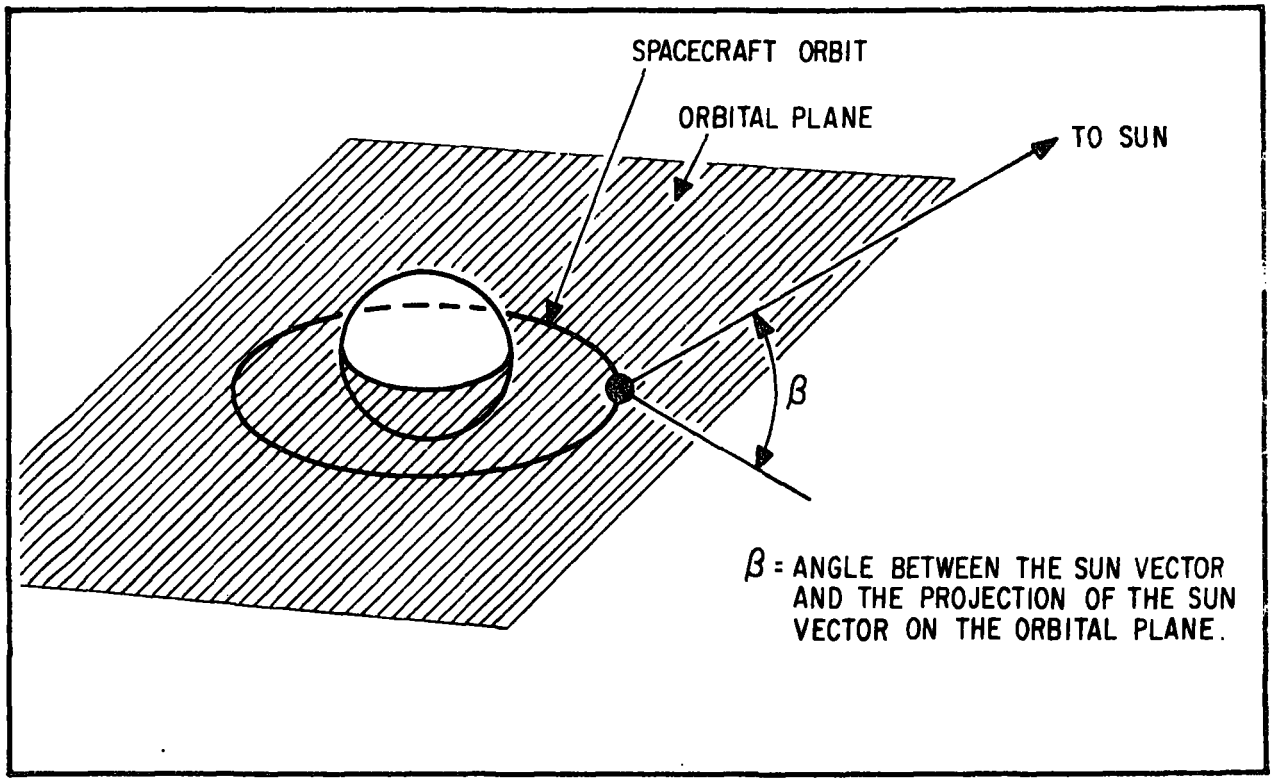

Figure 5-1 Beta Angle

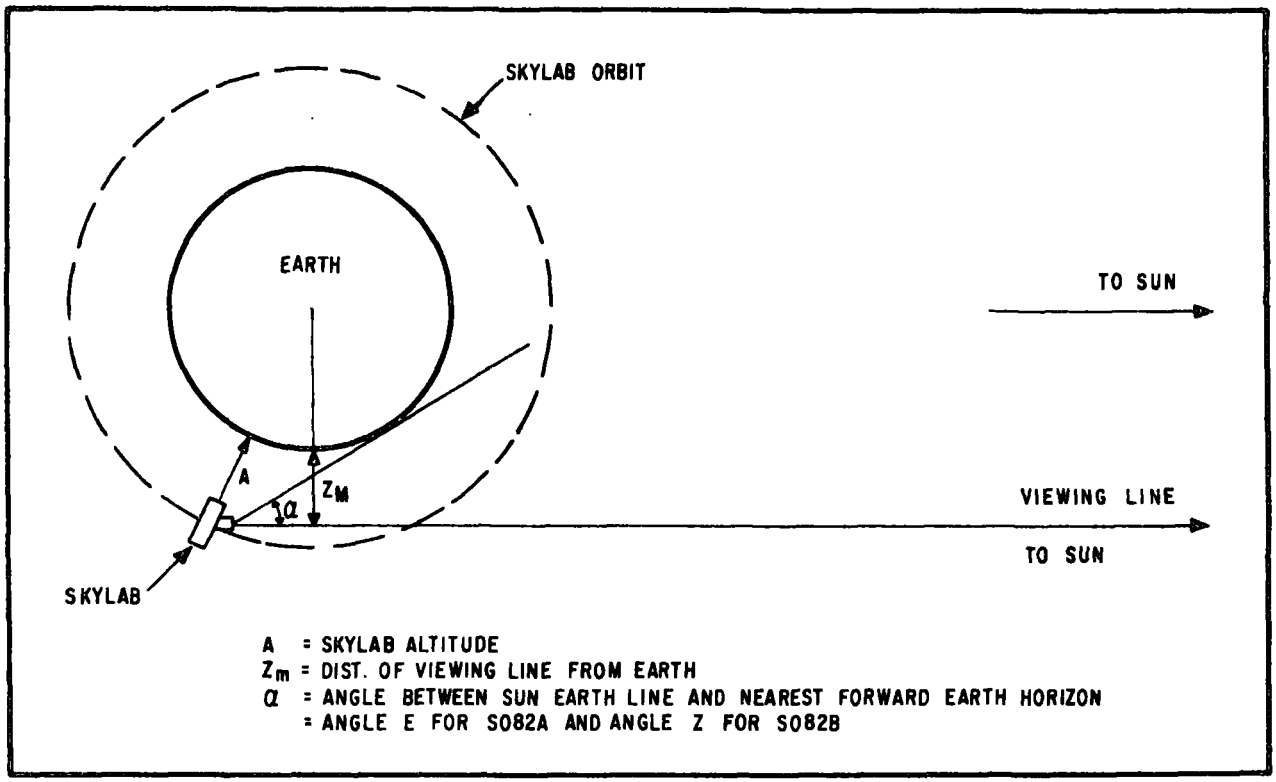

Figure 5-2 Extinction Parameters

S082A-EDB
INSTRUMENT OPERATION 5- 5-75 AT 18 HOURS 36 MINS 54 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)
218:22:32:53:533	33:13:192	0:19:501	2A-001	S	S	1	MAN	X	X	X		X	X	X	OK	OK
219:14: 3:43: 77	6:22:319	2:39:242	2A-002	L	L	1	MAN	X	4	5	G3	6	X	HI	OK	OK
219:14:13:15:307	10:25:306	0: 9:999	2A-003	S	S	1	MAN	X	X	5	MA	6	X	HI	OK	OK
219:15:44:25:786	44:35: 35	0: 9:249	2A-004	S	S	1	MAN	X	4	5	MA	6	X	HI	OK	OK
219:16:14:49:282	15:28:530	0:39:248	2A-005	S	S	1	MAN	X	4	5	M3	6	X	HI	OK	OK
219:18:46:35:267	47:54:514	1:19:247	2A-006	L	L	1	MAN	X	4	5	ML	6	X	HI	OK	OK
219:18:49:20:761	49:23:261	0: 2:500	2A-007	L	L	1	MAN	X	4	5	ML	6	X	HI	OK	OK
219:19:59:42:310	3: 4:550	3:22:240	2A-008	S	S	1	MAN	X	4	5	MA	6	X	HI	OK	OK
219:20: 3:14: 49	3:24: 49	0:10: 0	2A-009	S	S	1	AUTO 1	X	X	5	MA	6	X	HI	OK	OK
219:20: 3:26: 49	4: 5:797	0:39:748	2A-010	S	S	1	AUTO 1	X	X	5	MA	6	X	HI	OK	OK
219:20: 4: 7:797	6:47: 39	2:39:242	2A-011	S	S	1	AUTO 1	X	4	5	MA	6	X	HI	OK	OK
220: 1:54: 3: 48	54:42:796	0:39:748	2A-012	L	L	4	MAN	X	4	5	MA	6	B	HI	OK	OK
220: 1:55:48:293	56:27:791	0:39:498	2A-013	S	S	1	MAN	X	X	5	MA	6	X	HI	OK	OK
220:14:43:41:101	43:51:101	0:10: 0	2A-014	L	L	1	MAN	X	X	5	MA	6	X	HI	OK	OK
220:14:46: 5:344	48:44:585	2:39:241	2A-015	L	L	1	MAN	X	4	5	MA	6	X	HI	OK	OK
220:17:52:21:817	53: 1:315	0:39:498	2A-016	S	S	1	MAN	X	4	5	MA	6	X	HI	OK	OK
220:20:32: 1:603	32: 4:103	0: 2:500	2A-017	S	S	1/4	AUTO 1	X	4	5	MA	6	X	HI	OK	OK
220:20:32: 6:103	32:15:852	0: 9:749	2A-018	S	S	1/4	AUTO 1	X	4	5	MA	6	X	HI	OK	OK
220:20:32:17:852	32:57:850	0:39:998	2A-019	S	S	1/4	AUTO 1	X	4	5	MA	6	X	HI	OK	OK
221: 1:10:28:827	11: 6: 75	0:39:248	2A-020	S	S	1	MAN	X	4	5	MA	6	X	HI	OK	OK

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INSTRUMENT OPERATION 5- 5-75 AT 18 HOURS 36 MINS 54 SECS
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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)
2A-001	6524.00				25.00	60.00	521.79	2020.64	434.67	254.69	1216
		.000	.000	.000	30.00	60.00					
2A-002	10769.00				30.00	53.75	688.75	2269.57	433.74	126.66	1226
		.000	.000	.000	30.00	53.75					
2A-003	10768.00				30.00	53.75	690.53	630.30	438.67	331.70	1226
		.000	.000	.000	30.00	53.75					
2A-004	10392.00				30.00	53.75	707.70	413.04	439.20	242.50	1227
		.000	.000	.000	30.00	53.75					
2A-005	10646.00				30.00	53.75	736.54	1777.54	443.82	362.71	1228
		.000	.000	.000	30.00	53.75					
2A-006	10458.00				30.00	53.75	740.38	1509.85	436.40	414.94	1229
		.000	.000	.000	30.00	53.75					
2A-007	10457.00				30.00	53.75	741.24	755.29	438.46	370.89	1229
		.000	.000	.000	30.00	53.75					
2A-008	-10248.00				30.00	53.75	755.46	4271.03	433.84	-2056.59	1229
		.000	.000	.000	30.00	53.75					
2A-009	-10249.00				30.00	53.75	755.60	4641.96	431.44	-2655.45	1229
		.000	.000	.000	30.00	53.75					
2A-010	-10249.00				30.00	53.75	755.60	4641.96	431.44	-2655.45	1229
		.000	.000	.000	30.00	53.75					
2A-011	-10249.00				30.00	53.75	755.62	4584.07	431.07	-2560.98	1229
		.000	.000	.000	30.00	53.75					
2A-012	10773.00				30.00	53.75	819.52	406.34	446.00	241.65	1233
		.000	.000	.000	30.00	53.75					
2A-013	10772.00				30.00	53.75	819.86	630.34	445.90	335.47	1233
		.000	.000	.000	30.00	53.75					
2A-014	10705.00				30.00	53.75	960.30	4360.00	431.10	-2202.01	1241
		.000	.000	.000	30.00	53.75					
2A-015	10705.00				30.00	53.75	960.94	3948.00	430.90	-1589.01	1241
		.000	.000	.000	30.00	53.75					
2A-016	-9986.00				30.00	53.75	994.70	3998.00	431.00	-1659.01	1242
		.000	.000	.000	30.00	53.75					
2A-017	-10739.00				30.00	53.75	1024.84	270.23	446.07	170.87	1244
		.000	.000	.000	30.00	53.75					
2A-018	-10739.00				30.00	53.75	1024.84	286.76	446.07	180.01	1244
		.000	.000	.000	30.00	53.75					
2A-019	-10739.00				30.00	53.75	1024.84	329.91	446.07	203.18	1244
		.000	.000	.000	30.00	53.75					
2A-020	-10460.00				30.00	53.75	1075.62	2.77	445.95	1.96	1247
		.000	.000	.000	30.00	53.75					

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INSTRUMENT OPERATION 5- 5-75 AT 18 HOURS 36 MINS 54 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)
221: 1:11:30:574	12:10: 73	0:39:499	2A-021	L	L	1	MAN	X	4	5	MA	6	X	H1	OK	OK
221:15:20:32:429	21:12:177	0:39:748	2A-022	S	S	1	MAN	X	X	5	MA	6	B	H1	OK	OK
221:15:33:14:889	35:54:131	2:39:242	2A-023	L	L	1	MAN	X	4	5	MA	6	X	H1	OK	OK
221:15:46: 7:858	46:17:107	0: 9:249	2A-024	S	S	1	MAN	X	4	5	G3	6	X	H1	OK	OK
221:15:53:20:586	53:22: 86	0: 1:500	2A-025	S	S	1	MAN	X	4	5	G3	6	X	H1	OK	OK
221:15:54: 0:834	54: 3:334	0: 2:500	2A-026	S	S	1	FLARE	X	4	5	ML	6	B	H1	OK	OK
221:15:54: 5:334	54:15:333	0: 9:999	2A-027	S	S	1	FLARE	X	4	5	ML	6	B	H1	OK	OK
221:15:54:17: 83	54:57: 81	0:39:998	2A-028	S	S	1	FLARE	X	4	5	ML	6	B	H1	OK	OK
221:15:54:58:831	55: 3:831	0: 5: 0	2A-029	L	L	1	FLARE	X	4	5	ML	6	B	H1	OK	OK
221:15:55: 5:830	55:25:829	0:19:999	2A-030	L	L	1	FLARE	X	4	5	ML	6	B	H1	OK	OK
221:15:55:27:829	56:47:325	1:19:496	2A-031	L	L	1	FLARE	X	4	5	ML	6	B	H1	OK	OK
221:15:56:49:325	56:51:825	0: 2:500	2A-032	S	S	1	FLARE	X	4	5	ML	6	B	H1	OK	OK
221:15:56:53:825	57: 3:824	0: 9:999	2A-033	S	S	1	FLARE	X	4	5	ML	6	B	H1	OK	OK
221:15:57: 5:574	57: 6:324	0: 0:750	2A-034	S	S	1	FLARE	X	4	5	ML	6	B	H1	OK	OK
221:15:58:20:570	59: 0: 68	0:39:498	2A-035	S	S	1	MAN	X	4	5	ML	6	B	H1	OK	OK
221:19:49:18:588	49:57:586	0:38:998	2A-036	S	S	1	MAN	X	4	5	GS	6	B	H1	OK	OK
221:19:58:58:808	59: 8:808	0:10: 0	2A-037	S	S	1	MAN	X	X	5	GS	6	X	H1	OK	OK
221:20:17:24:346	18: 3:344	0:38:998	2A-038	S	S	1	MAN	X	4	5	GS	6	X	H1	OK	OK
221:20:33:48:550	33:58:550	0:10: 0	2A-039	S	S	1	MAN	X	X	5	MA	6	B	H1	OK	OK
222:22:12:45:605	15:25:357	2:39:752	2A-040	L	L	1	MAN	X	4	5	MA	6	X	H1	OK	OK

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INSTRUMENT OPERATION 5- 5-75 AT 18 HOURS 36 MINS 54 SECS
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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)
2A-021	-10459.00				30.00	53.75	1075.97	119.83	446.04	80.69	1247
		.000	.000	.000	30.00	53.75					
2A-022	10762.00				30.00	53.75	1234.13	2258.65	440.90	145.47	1255
		.000	.000	.000	30.00	53.75					
2A-023	-5586.00				30.00	53.75	1235.39	4163.85	431.78	-1900.04	1256
		.000	.000	.990	30.00	53.75					
2A-024	-10442.00				30.00	53.75	1236.57	2145.73	436.02	199.06	1256
		.000	.000	.000	30.00	53.75					
2A-025	-10445.00				30.00	53.75	1238.52	652.91	440.04	340.23	1256
		.000	.000	.000	30.00	53.75					
2A-026	-10445.00				30.00	53.75	1238.86	437.03	440.40	254.18	1256
		.000	.000	.000	30.00	53.75					
2A-027	-10445.00				30.00	53.75	1238.86	437.03	440.40	254.18	1256
		.000	.000	.000	30.00	53.75					
2A-028	-10445.00				30.00	53.75	1238.86	437.03	440.40	254.18	1256
		.000	.000	.000	30.00	53.75					
2A-029	-10446.00				30.00	53.75	1238.86	437.03	440.40	254.18	1256
		.000	.000	.000	30.00	53.75					
2A-030	-10446.00				30.00	53.75	1239.20	220.95	440.69	141.72	1256
		.000	.000	.000	30.00	53.75					
2A-031	-10446.00				30.00	53.75	1239.20	220.95	440.69	141.72	1256
		.000	.000	.000	30.00	53.75					
2A-032	-10446.00				30.00	53.75	1239.55	4.79	440.89	3.36	1256
		.000	.000	.000	30.00	53.75					
2A-033	-10446.00				30.00	53.75	1239.55	4.79	440.89	3.36	1256
		.000	.000	.000	30.00	53.75					
2A-034	-10447.00				30.00	53.75	1239.90	-229.34	441.01	425.88	1256
		.000	.000	.000	30.00	53.75					
2A-035	-10447.00				30.00	53.75	1240.24	-499.26	441.04	369.29	1256
		.000	.000	.660	30.00	53.75					
2A-036	-10783.00				30.00	53.75	1282.68	47.20	446.08	32.72	1258
		.000	.000	.000	30.00	53.75					
2A-037	-10785.00				30.00	53.75	1285.53	1899.61	442.40	319.13	1258
		.000	.000	.000	30.00	53.75					
2A-038	-10791.00				30.00	53.75	1287.31	3742.09	432.16	-1304.89	1258
		.000	.000	.000	30.00	53.75					
2A-039	-7443.00				30.00	53.75	1290.43	576.64	440.33	312.93	1259
		.000	.000	.660	30.00	53.75					
2A-040	-10766.00				30.00	53.75	1575.87	-219.99	446.02	432.13	1274
		.000	.000	.000	30.00	53.75					

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INSTRUMENT OPERATION 5- 5-75 AT 18 HOURS 36 MINS 54 SECS
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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)
2A-021	-10459.00				30.00	53.75	1075.97	119.83	446.04	80.69	1247
		.000	.000	.000	30.00	53.75					
2A-022	10762.00				30.00	53.75	1234.13	2258.65	440.90	145.47	1255
		.000	.000	.000	30.00	53.75					
2A-023	-5586.00				30.00	53.75	1235.39	4163.85	431.78	-1900.04	1256
		.000	.000	.990	30.00	53.75					
2A-024	-10442.00				30.00	53.75	1236.57	2145.73	436.02	199.06	1256
		.000	.000	.000	30.00	53.75					
2A-025	-10445.00				30.00	53.75	1238.52	652.91	440.04	340.23	1256
		.000	.000	.000	30.00	53.75					
2A-026	-10445.00				30.00	53.75	1238.86	437.03	440.40	254.18	1256
		.000	.000	.000	30.00	53.75					
2A-027	-10445.00				30.00	53.75	1238.86	437.03	440.40	254.18	1256
		.000	.000	.000	30.00	53.75					
2A-028	-10445.00				30.00	53.75	1238.86	437.03	440.40	254.18	1256
		.000	.000	.000	30.00	53.75					
2A-029	-10446.00				30.00	53.75	1238.86	437.03	440.40	254.18	1256
		.000	.000	.000	30.00	53.75					
2A-030	-10446.00				30.00	53.75	1239.20	220.95	440.69	141.72	1256
		.000	.000	.000	30.00	53.75					
2A-031	-10446.00				30.00	53.75	1239.20	220.95	440.69	141.72	1256
		.000	.000	.000	30.00	53.75					
2A-032	-10446.00				30.00	53.75	1239.55	4.79	440.89	3.36	1256
		.000	.000	.000	30.00	53.75					
2A-033	-10446.00				30.00	53.75	1239.55	4.79	440.89	3.36	1256
		.000	.000	.000	30.00	53.75					
2A-034	-10447.00				30.00	53.75	1239.90	-229.34	441.01	425.88	1256
		.000	.000	.000	30.00	53.75					
2A-035	-10447.00				30.00	53.75	1240.24	-499.26	441.04	369.29	1256
		.000	.000	.660	30.00	53.75					
2A-036	-10783.00				30.00	53.75	1282.68	47.20	446.08	32.72	1258
		.000	.000	.000	30.00	53.75					
2A-037	-10785.00				30.00	53.75	1285.53	1899.61	442.40	319.13	1258
		.000	.000	.000	30.00	53.75					
2A-038	-10791.00				30.00	53.75	1287.31	3742.09	432.16	-1304.89	1258
		.000	.000	.000	30.00	53.75					
2A-039	-7443.00				30.00	53.75	1290.43	576.64	440.33	312.93	1259
		.000	.000	.660	30.00	53.75					
2A-040	-10766.00				30.00	53.75	1575.87	-219.99	446.02	432.13	1274
		.000	.000	.000	30.00	53.75					

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INSTRUMENT OPERATION 5- 5-75 AT 18 HOURS 36 MINS 54 SECS
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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)
2A-041	-10766.00				30.00	53.75	1577.24	448.33	445.69	261.28	1274
		.000	.000	.000	30.00	53.75					
2A-042	-10793.00				30.00	53.75	1609.83	-563.23	445.74	354.40	1276
		.000	.000	.000	30.00	53.75					
2A-043	-10793.00				30.00	53.75	1610.16	-303.13	445.96	419.51	1276
		.000	.000	.000	30.00	53.75					
2A-044	-10798.00				30.00	53.75	1616.52	2000.59	437.55	270.77	1276
		.000	.000	.000	30.00	53.75					
2A-045	-10754.00				30.00	53.75	1748.48	-193.32	446.10	435.31	1283
		.000	.000	.000	30.00	53.75					
2A-046	-10754.00				30.00	53.75	1749.51	390.52	445.61	233.82	1283
		.000	.000	.000	30.00	53.75					
2A-047	10644.00				30.00	53.75	1785.08	1093.76	443.78	437.02	1285
		.000	.000	.000	30.00	53.75					
2A-048	10644.00				30.00	53.75	1785.08	1093.76	443.78	437.02	1285
		.000	.000	.000	30.00	53.75					
2A-049	10644.00				30.00	53.75	1785.08	1093.76	443.78	437.02	1285
		.000	.000	.000	30.00	53.75					
2A-050	-958.00				30.00	53.75	1789.00	1796.45	438.61	349.49	1286
		.000	.000	.000	30.00	53.75					
2A-051	10449.00				30.00	53.75	1802.39	1242.18	443.40	443.40	1286
		.000	.000	.000	30.00	53.75					
2A-052	10439.00				30.00	53.75	1816.91	-303.85	446.05	419.36	1287
		.000	.000	.000	30.00	53.75					
2A-053	10437.00				30.00	53.75	1818.94	802.10	444.69	387.37	1287
		.000	.000	.990	30.00	53.75					
2A-054	10429.00				30.00	53.75	1821.59	3439.87	433.71	-921.88	1287
		.000	.000	.000	30.00	53.75					
2A-055	10421.00				30.00	53.75	1834.70	92.26	446.00	62.82	1288
		.000	.000	.990	30.00	53.75					
2A-056	10409.00				30.00	53.75	1838.93	3403.08	433.53	-878.97	1288
		.000	.000	.000	30.00	53.75					
2A-057	-5442.00				30.00	53.75	1868.88	-62.50	445.96	444.84	1290
		.000	.000	.000	30.00	53.75					
2A-058	-5443.00				30.00	53.75	1869.12	107.57	445.88	72.72	1290
		.000	.000	.000	30.00	53.75					
2A-059	10748.00				30.00	53.75	1873.78	2500.41	436.72	-18.04	1290
		.000	.000	.330	30.00	53.75					
2A-060	-10676.00				30.00	53.75	2113.97	1203.62	440.52	440.09	1303
		.000	.000	.000	30.00	53.75					

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INSTRUMENT OPERATION 5- 5-75 AT 18 HOURS 36 MINS 54 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)
225: 1:29:27:850	30:47: 7	1:19:157	2A-061	L	L	1	MAN	X	4	5	MA	6	X	HI	OK	OK
225: 1:32:52:764	33:32: 16	0:39:252	2A-062	S	S	1	MAN	X	4	5	MA	6	X	HI	OK	OK
225: 1:37:42:528	38:22: 30	0:39:502	2A-063	S	S	1	MAN	X	4	5	G3	6	X	HI	OK	OK
225: 1:39:25:784	40:45: 38	1:19:254	2A-064	L	L	1	MAN	X	4	5	G3	6	X	HI	OK	OK
225:14:17:44:299	19: 3:553	1:19:254	2A-065	L	L	1	MAN	X	4	5	MA	6	X	HI	OK	OK
225:14:19:33:304	20:12:556	0:39:252	2A-066	S	S	1	MAN	X	4	5	MA	6	X	HI	OK	OK
225:20:16:20:561	16:39:562	0:19: 1	2A-067	L	L	1	MAN	X	X	5	G5	6	X	HI	OK	OK
225:20:20:25: 75	23: 4:416	2:39:341	2A-068	L	L	1	MAN	X	X	5	G3	6	X	HI	OK	OK
225:20:42:46:475	42:55:476	0: 9: 1	2A-069	S	S	1	MAN	X	4	5	MA	6	X	HI	OK	OK
225:20:45:40:235	46:19:487	0:39:252	2A-070	S	S	1	MAN	X	4	5	MA	6	X	HI	OK	OK
226: 0:50:44:211	51:23:213	0:39: 2	2A-071	L	L	1	MAN	X	4	5	MA	6	X	HI	OK	OK
226: 0:51:45:715	51:55:715	0:10: 0	2A-072	S	S	1	MAN	X	4	5	MA	6	X	HI	OK	OK
226:13:14:50:830	16:30:335	1:39:505	2A-073	L	L	1	MAN	X	4	5	G5	6	X	HI	OK	OK
226:13:19:20:230	19:59:311	0:39: 81	2A-074	S	S	1	MAN	X	4	5	MA	6	X	HI	OK	OK
226:13:26:19:625	26:29:292	0: 9:667	2A-075	S	S	1	MAN	X	4	5	G3	6	X	HI	OK	OK
226:13:27: 7:791	28:47:288	1:39:497	2A-076	L	L	1	MAN	X	4	5	G3	6	X	HI	OK	OK
226:13:56:11: 24	58:42:282	2:31:258	2A-077	L	L	1	MAN	X	4	5	G5	6	B	HI	OK	OK
226:19:23:32:303	26:11:311	2:39: 8	2A-078	L	L	1	MAN	X	4	5	MA	6	X	HI	OK	OK
226:19:27:15: 64	29:54:324	2:39:260	2A-079	L	L	1	MAN	X	4	5	MA	6	X	HI	OK	OK
227: 1:41:54:717	42:34:219	0:39:502	2A-080	L	L	1	MAN	X	4	5	MA	6	X	HI	OK	OK

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INSTRUMENT OPERATION 5- 5-75 AT 18 HOURS 36 MINS 54 SECS
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FRAME COUNT	GAMRR (ARCMINS)	MAX PT EXC (ARCSEC) GAMX	GAMY	(ARCMINS) GAMRR	--NRL BIAS-- (ARCSEC) GXBI	GYBI	ANGLE (ARCMINS) -B- OPEN	-E- OPEN	ALTITUDE (KM)	Z(M) (KM)	ORBIT NUMBER
(D)	(R)	(S)	(T)	(U)			(V)	(W)	(X)	(Y)	(Z)
2A-061	10798.00				30.00	53.75	2141.11	-155.32	445.90	438.94	1305
		.000	.000	.000	30.00	53.75					
2A-062	10798.00				30.00	53.75	2141.96	483.00	445.21	276.70	1305
		.000	.000	.000	30.00	53.75					
2A-063	-5404.00				30.00	53.75	2143.44	1369.00	442.21	437.80	1305
		.000	.000	.000	30.00	53.75					
2A-064	-5404.00				30.00	53.75	2143.90	1597.46	440.66	404.39	1305
		.000	.000	.000	30.00	53.75					
2A-065	10696.00				30.00	53.75	2279.26	3058.56	434.05	-503.24	1313
		.000	.000	.000	30.00	53.75					
2A-066	10696.00				30.00	53.75	2279.30	3116.14	434.11	-561.70	1313
		.000	.000	.000	30.00	53.75					
2A-067	10690.00				30.00	53.75	2344.39	1275.00	441.60	441.38	1316
		.000	.000	.000	30.00	53.75					
2A-068	10689.00				30.00	53.75	2345.18	1875.33	438.53	322.39	1316
		.000	.000	.000	30.00	53.75					
2A-069	10680.00				30.00	53.75	2346.70	2291.90	438.37	121.52	1316
		.000	.000	.000	30.00	53.75					
2A-070	10680.00				30.00	53.75	2347.32	1847.80	439.79	334.04	1316
		.000	.000	.000	30.00	53.75					
2A-071	10800.00				30.00	53.75	2392.57	384.76	444.51	401.82	1319
		.000	.000	.990	30.00	53.75					
2A-072	10799.00				30.00	53.75	2392.57	384.76	444.51	230.64	1319
		.000	.000	.330	30.00	53.75					
2A-073	-10727.00				30.00	53.75	2522.39	13.74	445.32	9.64	1326
		.000	.000	.000	30.00	53.75					
2A-074	-10727.00				30.00	53.75	2523.92	723.21	442.80	364.22	1326
		.000	.000	.000	30.00	53.75					
2A-075	-5329.00				30.00	53.75	2525.35	1836.99	437.74	334.81	1327
		.000	.000	.000	30.00	53.75					
2A-076	-5329.00				30.00	53.75	2525.47	1979.32	437.09	279.20	1327
		.000	.000	.000	30.00	53.75					
2A-077	10607.00				30.00	53.75	2528.93	911.78	441.27	409.55	1327
		.000	.000	.000	30.00	53.75					
2A-078	-5245.00				30.00	53.75	2585.67	-702.31	445.74	303.92	1330
		.000	.000	.000	30.00	53.75					
2A-079	-5246.00				30.00	53.75	2586.99	-81.52	445.22	443.28	1330
		.000	.000	.000	30.00	53.75					
2A-080	-10762.00				30.00	53.75	2650.96	45.59	444.79	31.57	1334
		.000	.000	.000	30.00	53.75					

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INSTRUMENT OPERATION 5- 5-75 AT 18 HOURS 36 MINS 54 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)
227: 1:43:24:971	43:34:222	0: 9:251	2A-081	S	S	1	MAN	X	4	5	MA	6	X	HI	OK	OK
227: 1:50:54:994	51:34:246	0:39:252	2A-082	S	S	1	MAN	X	4	5	G3	6	X	HI	OK	OK
227: 1:52:21:499	52:41:250	0:19:751	2A-083	L	L	1	MAN	X	4	5	G3	6	X	HI	OK	OK
227:14:26:46:917	22:26:379	1:39:462	2A-084	L	L	1	MAN	X	4	5	MA	6	X	HI	OK	OK
227:14:23:32:882	24:12:134	0:39:252	2A-085	S	S	1	MAN	X	4	5	MA	6	X	HI	OK	OK
227:14:30:24:599	32: 3:258	1:38:659	2A-086	L	L	1	MAN	X	4	5	G3	6	X	HI	OK	OK
227:15:40:23:265	40:32:266	0: 9: 1	2A-087	S	S	1	MAN	X	X	5	MA	6	X	HI	OK	OK
227:16:15:15:552	15:55: 51	0:39:499	2A-088	S	S	1	MAN	X	X	5	ML	6	B	HI	OK	OK
227:17:10:57:515	11: 7: 16	0: 9:501	2A-089	S	S	1	MAN	X	4	5	MA	6	B	HI	OK	OK
227:17:54:21:528	55: 0:777	0:39:249	2A-090	S	S	1	MAN	X	X	5	ML	6	X	HI	OK	OK
227:19: 9:11:658	11:50:666	2:39: 8	2A-091	L	L	1	MAN	X	4	5	MA	6	X	HI	OK	OK
227:19:31:28:506	31:38:505	0: 9:999	2A-092	S	S	1	MAN	X	X	5	MA	6	X	HI	OK	OK
227:21:53:18:823	54:58:328	1:39:505	2A-093	L	L	1	MAN	X	4	5	G3	6	X	HI	OK	OK
227:21:57:39:835	58:19:337	0:39:502	2A-094	S	S	1	MAN	X	4	5	G3	6	X	HI	OK	OK
228: 1: 5: 1:326	5:40:574	0:39:248	2A-095	L	L	1	MAN	X	4	5		6	X	HI	OK	OK
228: 1: 6: 9:322	6:19:322	0:10: 0	2A-096	S	S	1	MAN	X	4	5		6	X	HI	OK	OK
228:13:32: 6:498	34:45:993	2:39:495	2A-097	L	L	1	MAN	X	4	5	MA	6	X	HI	OK	OK
228:13:35:41:493	35:50:994	0: 9:501	2A-098	S	S	1	MAN	X	4	5	MA	6	X	HI	OK	OK
228:19:41: 6:913	41:45:915	0:39: 2	2A-099	S	S	1	MAN	X	4	5	MA	6	X	HI	OK	OK
229: 1:51:13: 25	51:52: 27	0:39: 2	2A-100	L	L	1	MAN	X	4	5	MA	6	X	HI	OK	OK

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INSTRUMENT OPERATION 5- 5-75 AT 18 HOURS 36 MINS 54 SECS
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FRAME COUNT	GAMRR (ARCMINS)	MAX PT EAC (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)
2A-081	-10762.00				30.00	53.75	2651.58	375.73	443.77	225.94	1334
		.000	.000	.000	30.00	53.75					
2A-082	-5364.00				30.00	53.75	2653.20	1484.30	438.92	421.77	1334
		.000	.000	.000	30.00	53.75					
2A-083	-5364.00				30.00	53.75	2653.48	1771.52	437.59	355.85	1334
		.000	.000	.000	30.00	53.75					
2A-084	-10562.00				30.00	53.75	2778.68	1951.28	436.58	290.10	1341
		.000	.000	.000	30.00	53.75					
2A-085	-10563.00				30.00	53.75	2778.81	2271.09	435.73	129.25	1341
		.000	.000	.000	30.00	53.75					
2A-086	-5179.00				30.00	53.75	2778.88	2616.66	436.57	-104.73	1342
		.000	.000	.330	30.00	53.75					
2A-087	10783.00				30.00	53.75	2791.47	.45	444.26	.32	1342
		.000	.000	.000	30.00	53.75					
2A-088	10770.00				30.00	53.75	2795.65	1734.98	441.76	372.36	1343
		.000	.000	.990	30.00	53.75					
2A-089	10617.00				30.00	53.75	2805.83	-363.08	445.18	407.20	1343
		.000	.000	.000	30.00	53.75					
2A-090	10601.00				30.00	53.75	2812.66	917.06	441.73	410.89	1344
		.000	.000	.000	30.00	53.75					
2A-091	-5326.00				30.00	53.75	2825.00	2565.79	436.49	-66.20	1344
		.000	.000	.000	30.00	53.75					
2A-092	-10734.00				30.00	53.75	2829.19	338.19	440.08	205.85	1345
		.000	.000	.000	30.00	53.75					
2A-093	-10743.00				30.00	53.75	2852.63	42.09	444.34	29.17	1346
		.000	.000	.000	30.00	53.75					
2A-094	-10744.00				30.00	53.75	2853.75	614.43	441.96	327.76	1346
		.000	.000	.330	30.00	53.75					
2A-095	-10784.00				30.00	53.75	2884.14	833.68	440.83	392.58	1348
		.000	.000	.000	30.00	53.75					
2A-096	-10784.00				30.00	53.75	2884.35	1000.25	440.13	423.29	1348
		.000	.000	.000	30.00	53.75					
2A-097	-10693.00				28.75	56.25	3002.09	921.91	439.75	410.32	1355
		.000	.000	.000	28.75	56.25					
2A-098	-10694.00				28.75	56.25	3002.54	1328.47	437.89	435.58	1355
		.000	.000	.000	28.75	56.25					
2A-099	-5423.00				28.75	56.25	3058.39	341.43	442.24	208.12	1359
		.000	.000	.000	28.75	56.25					
2A-100	10780.00				28.75	56.25	3113.12	-91.55	443.82	444.00	1364
		.000	.000	.000	28.75	56.25					

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INSTRUMENT OPERATION 5- 5-75 AT 18 HOURS 36 MINS 54 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)
229: 1:59:46: 51	0:24:803	0:38:752	2A-101	S	S	1	MAN	X	4	5	G3	6	X	HI	OK	OK
229:11:33: 7:440	35:46:698	2:39:258	2A-102	L	L	1	MAN	X	4	5	GS	6	X	HI	OK	OK
229:11:36:26:950	36:36:951	0:10: 1	2A-103	S	S	1	MAN	X	4	5	MA	6	X	HI	OK	OK
229:11:43: 1:720	43:41:722	0:40: 2	2A-104	S	S	1	MAN	X	4	5	G3	6	B	HI	OK	OK
229:11:44: 1:723	44:41:726	0:40: 3	2A-105	L	L	1	MAN	X	4	5	G3	6	B	HI	OK	OK
229:16:14:56:361	15: 5:111	0: 8:750	2A-106	S	S	1	MAN	X	X	5	MA	6	X	HI	OK	OK
229:16:16:26:365	19: 5:809	2:39:444	2A-107	L	L	1	MAN	X	X	5	MA	6	X	HI	OK	OK
229:17:26:27: 39	27: 6:620	0:39:581	2A-108	S	S	1	MAN	X	4	5	GS	6	X	HI	OK	OK
229:19: 1: 9:687	1:48:439	0:38:752	2A-109	S	S	1	MAN	X	X	5	GS	6	B	HI	OK	OK
229:19:19:42:995	22:22:502	2:39:507	2A-110	L	L	1	MAN	X	X	5	M3	6	B	HI	OK	OK
229:20:34: 9:104	34:18:104	0: 9: 0	2A-111	S	S	1	MAN	X	4	5	GS	6	X	HI	OK	OK
229:20:51:32:389	54:32:399	3: 0: 10	2A-112	S	S	1	MAN	X	X	5	MA	6	B	HI	OK	OK
229:23:36:35:482	37:14:984	0:39:502	2A-113	S	S	1	MAN	X	4	5	MA	6	X	HI	OK	OK
230: 1: 9:50:431	10:29:683	0:39:252	2A-114	L	L	1	MAN	X	4	5	MA	6	X	HI	OK	OK
230: 1:19:13:460	19:22:710	0: 9:250	2A-115	S	S	1	MAN	X	4	5	G3	6	X	HI	OK	OK
230: 1:21:29:716	24: 8:725	2:39: 9	2A-116	L	L	1	MAN	X	4	5	G3	6	B	HI	OK	OK
230:12: 2:34: 60	3:13:391	0:39:331	2A-117	S	S	1	MAN	X	4	5	MA	6	X	HI	OK	OK
230:13:37:45:842	37:55:842	0:10: 0	2A-118	S	S	1	MAN	X	4	5	MA	6	X	HI	OK	OK
230:13:39:24:790	41:24:287	1:59:497	2A-119	L	L	1	MAN	X	4	5	MA	6	B	HI	OK	OK
230:15:12:54:518	13:33:270	0:38:752	2A-120	L	L	1	MAN	X	4	5	MA	6	X	HI	OK	OK

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INSTRUMENT OPERATION 5- 5-75 AT 18 HOURS 36 MINS 54 SECS
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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)
2A-101	-5418.00				28.75	56.25	3114.93	992.62	438.81	421.14	1364
		.000	.000	.000	28.75	56.25					
2A-102	-10793.00				28.75	56.25	3195.98	2178.22	437.64	-4219.99	1370
		.000	.000	.990	28.75	56.25					
2A-103	-10794.00				28.75	56.25	3196.00	2189.46	439.00	-4219.99	1370
		.000	.000	.000	28.75	56.25					
2A-104	-5396.00				28.75	56.25	3196.68	1834.30	441.70	-4219.99	1370
		.000	.000	.000	28.75	56.25					
2A-105	-5396.00				28.75	56.25	3196.86	1746.87	441.88	-4219.99	1370
		.000	.000	.000	28.75	56.25					
2A-106	-10765.00				28.75	56.25	3234.83	2155.72	438.48	197.96	1371
		.000	.000	.000	28.75	56.25					
2A-107	-10766.00				28.75	56.25	3234.66	2148.65	439.42	203.20	1371
		.000	.000	.330	28.75	56.25					
2A-108	-5261.00				28.75	56.25	3246.31	175.75	441.80	115.06	1372
		.000	.000	.990	28.75	56.25					
2A-109	-7591.00				28.75	56.25	3259.40	403.40	440.61	238.45	1373
		.000	.000	.000	28.75	56.25					
2A-110	-7590.00				28.75	56.25	3260.30	2104.25	437.94	223.20	1373
		.000	.000	.000	28.75	56.25					
2A-111	-5392.00				28.75	56.25	3271.89	362.85	440.70	218.57	1374
		.000	.000	.990	28.75	56.25					
2A-112	-10331.00				28.75	56.25	3272.82	2050.92	437.50	248.04	1374
		.000	.000	.000	28.75	56.25					
2A-113	-5341.00				28.75	56.25	3295.35	-169.91	443.44	435.11	1376
		.000	.000	.000	28.75	56.25					
2A-114	-5328.00				28.75	56.25	3307.40	-174.26	443.54	434.73	1377
		.000	.000	.000	28.75	56.25					
2A-115	-10726.00				28.75	56.25	3309.34	1027.73	437.85	424.99	1377
		.000	.000	.000	28.75	56.25					
2A-116	-10726.00				28.75	56.25	3309.48	1286.19	437.12	436.45	1377
		.000	.000	.000	28.75	56.25					
2A-117	-5241.00				28.75	56.25	3389.03	-216.60	442.89	429.36	1383
		.000	.000	.000	28.75	56.25					
2A-118	-10550.00				28.75	56.25	3400.57	.86	442.01	.60	1384
		.000	.000	.330	28.75	56.25					
2A-119	-10550.00				28.75	56.25	3401.01	180.22	440.82	117.63	1384
		.000	.000	.000	28.75	56.25					
2A-120	-5140.00				28.75	56.25	3411.92	140.38	440.94	93.16	1385
		.000	.000	.990	28.75	56.25					

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INSTRUMENT OPERATION 5- 5-75 AT 18 HOURS 36 MINS 54 SECS
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SHUTTER OPEN (A)	SHUTTER CLOSE (B)	EXPOSURE TIME (C)	FRAME COUNT (D)	WVL -G- (E)	WVL -M- (F)	MULT (G)	MODE (H)	OP EXP (I)	OP EXP (J)	OP EXP (K)	OP EXP (L)	OP EXP (M)	OP EXP (N)	OP EXP (O)	TEMP OP (P)	TEMP CL (Q)
230:16:42: 7:592	42:46:844	0:39:252	2A-121	S	S	1	MAN	X	4	5	MA	6	X	HI	OK	OK
230:18:15:53:473	16:32:471	0:38:998	2A-122	L	L	1	MAN	X	4	5	M3	6	X	HI	OK	OK
230:19:48:53:474	49:33:222	0:39:748	2A-123	S	S	1	MAN	X	4	5	MA	6	X	HI	OK	OK
230:21:21:59:701	24:38:943	2:39:242	2A-124	L	L	1	MAN	X	4	5	MA	6	X	HI	OK	OK
230:22:54: 8:519	54:47:767	0:39:248	2A-125	L	L	1	MAN	X	4	5	MA	6	X	HI	OK	OK
231: 0:28:54:762	29:34:510	0:39:748	2A-126	L	L	1	MAN	X	4	5	MA	6	X	HI	OK	OK
231: 0:29:50:259	30:29:507	0:39:248	2A-127	S	S	1	MAN	X	4	5	MA	6	X	HI	OK	OK
231:13:17:44:660	18:23:658	0:38:998	2A-128	S	S	1	MAN	X	4	5	G3	6	X	HI	OK	OK
231:13:38:30:716	39:49:712	1:18:996	2A-129	L	L	1	MAN	X	4	5	MA	6	X	HI	OK	OK
231:15:57:36: 56	58:15: 54	0:38:998	2A-130	S	S	1	MAN	X	4	5	MA	6	X	HI	OK	OK
231:16:17:10:424	17:50:172	0:39:748	2A-131	S	S	1	MAN	X	X	5	ML	6	X	HI	OK	OK
231:16:17:55:421	18:35:669	0:40:248	2A-132	S	S	1	MAN	X	X	5	ML	6	X	HI	OK	OK
231:16:18:40:169	19:20:417	0:40:248	2A-133	S	S	1	MAN	X	X	5	ML	6	X	HI	OK	OK
231:16:19:25:917	20: 5:415	0:39:498	2A-134	S	S	1	MAN	X	X	5	ML	6	X	HI	OK	OK
231:16:20:10:164	20:50:412	0:40:248	2A-135	S	S	1	MAN	X	X	5	ML	6	X	HI	OK	OK
231:16:20:55:412	21:35:160	0:39:748	2A-136	S	S	1	MAN	X	X	5	ML	6	X	HI	OK	OK
231:16:21:40:160	22:20:408	0:40:248	2A-137	S	S	1	MAN	X	X	5	ML	6	X	HI	OK	OK
231:16:22:25:407	23: 5:405	0:39:998	2A-138	S	S	1	MAN	X	X	5	ML	6	X	HI	OK	OK
231:16:23:10:405	23:50:403	0:39:998	2A-139	S	S	1	MAN	X	X	5	ML	6	X	HI	OK	OK
231:16:24:40:401	25:20:399	0:39:998	2A-140	S	S	1	MAN	X	X	5	ML	6	X	HI	OK	OK

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INSTRUMENT OPERATION 5- 5-75 AT 18 HOURS 36 MINS 54 SECS
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FRAME COUNT	GAMRK (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)
2A-121	-5399.00				28.75	56.25	3422.03	-260.32	442.77	423.30	1386
		.000	.000	.000	28.75	56.25					
2A-122	-5388.00				28.75	56.25	3432.68	-202.53	442.83	430.99	1387
		.000	.000	.000	28.75	56.25					
2A-123	-5233.00				28.75	56.25	3443.15	-240.10	442.89	426.28	1388
		.000	.000	.000	28.75	56.25					
2A-124	-5218.00				28.75	56.25	3453.39	-265.26	442.92	422.62	1389
		.000	.000	.000	28.75	56.25					
2A-125	-5502.00				28.75	56.25	3463.45	-405.48	443.02	395.63	1390
		.000	.000	.000	28.75	56.25					
2A-126	-10722.00				28.75	56.25	3473.60	-226.57	442.59	427.79	1391
		.000	.000	.000	28.75	56.25					
2A-127	-10723.00				28.75	56.25	3473.84	-113.62	442.02	438.28	1391
		.000	.000	.000	28.75	56.25					
2A-128	-5110.00				28.75	56.25	3548.40	1782.02	440.55	356.76	1399
		.000	.000	.000	28.75	56.25					
2A-129	-5107.00				28.75	56.25	3551.13	640.92	436.69	334.38	1399
		.000	.000	.000	28.75	56.25					
2A-130	-5049.00				28.75	56.25	3563.42	-733.83	443.79	288.98	1400
		.000	.000	.000	28.75	56.25					
2A-131	-10448.00				28.75	56.25	3565.53	1374.70	438.06	432.77	1400
		.000	.000	.000	28.75	56.25					
2A-132	-10448.00				28.75	56.25	3565.53	1374.70	438.06	432.77	1400
		.000	.000	.000	28.75	56.25					
2A-133	-10447.00				28.75	56.25	3565.46	1453.30	438.37	425.21	1400
		.000	.000	.000	28.75	56.25					
2A-134	-10447.00				28.75	56.25	3565.39	1525.58	438.73	415.24	1400
		.000	.000	.000	28.75	56.25					
2A-135	-10447.00				28.75	56.25	3565.32	1591.07	439.13	403.74	1400
		.000	.000	.000	28.75	56.25					
2A-136	-10447.00				28.75	56.25	3565.32	1591.07	439.13	403.74	1400
		.000	.000	.000	28.75	56.25					
2A-137	-10447.00				28.75	56.25	3565.24	1649.30	439.56	391.58	1400
		.000	.000	.000	28.75	56.25					
2A-138	-10447.00				28.75	56.25	3565.17	1699.84	440.01	379.58	1400
		.000	.000	.000	28.75	56.25					
2A-139	-10447.00				28.75	56.25	3565.11	1742.31	440.46	368.50	1400
		.000	.000	.000	28.75	56.25					
2A-140	-10447.00				28.75	56.25	3565.06	1776.35	440.92	359.03	1400
		.000	.000	.000	28.75	56.25					

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INSTRUMENT OPERATION 5- 5-75 AT 18 HOURS 36 MINS 54 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)
231:16:25:25:398	26: 5:396	0:39:998	2A-141	S	S	1	MAN	X	X	5	ML	6	X	HI	OK	OK
231:16:26:10:146	26:55:144	0:44:998	2A-142	S	S	1	MAN	X	X	5	ML	6	X	HI	OK	OK
231:16:27:10:393	27:50:141	0:39:748	2A-143	S	S	1	MAN	X	X	5	ML	6	X	HI	OK	OK
231:16:27:55:141	28:35:139	0:39:998	2A-144	S	S	1	MAN	X	X	5	ML	6	X	HI	OK	OK
231:16:28:40:138	29:20:136	0:39:998	2A-145	S	S	1	MAN	X	X	5	ML	6	X	HI	OK	OK
231:16:29:25:386	30: 5:384	0:39:998	2A-146	S	S	1	MAN	X	X	5	ML	6	X	HI	OK	OK
231:16:30:10:134	30:50:132	0:39:998	2A-147	S	S	1	MAN	X	X	5	ML	6	X	HI	OK	OK
231:16:39:31:610	40:51:106	1:19:496	2A-148	L	L	1	MAN	X	4	5	ML	6	X	HI	OK	OK
231:19:10:11:201	10:50:699	0:39:498	2A-149	S	S	1	MAN	X	4	5	MA	6	X	HI	OK	OK
231:19:55:37:827	56:57:573	1:19:746	2A-150	L	L	1	MAN	X	4	5	GS	6	X	HI	OK	OK
231:22:15:11:185	15:50:183	0:38:998	2A-151	S	S	1	MAN	X	4	5	ML	6	X	HI	OK	OK
231:23: 1:53: 58	3:12: 54	1:18:996	2A-152	L	L	1	MAN	X	4	5	MA	6	X	HI	OK	OK
232: 1:29:50:659	30:29:894	0:39:235	2A-153	S	S	1	MAN	X	4	5	G3	6	X	HI	OK	OK
232: 2: 6:56: 63	8:15:549	1:19:496	2A-154	L	L	1	MAN	X	4	5	MA	6	X	HI	OK	OK
232: 5: 8:15:818	8:35:817	0:19:999	2A-155	L	L	1	AUTO 2	X	4	5	MA	6	X	X	OK	OK
232: 5: 8:37:567	8:47:565	0: 9:998	2A-156	S	S	1	AUTO 2	X	4	5	MA	6	X	X	OK	OK
232: 5: 8:49:565	10: 9:312	1:19:747	2A-157	L	L	1	AUTO 2	X	4	5	MA	6	X	X	OK	OK
232: 5:10:11:312	10:51: 60	0:39:748	2A-158	S	S	1	AUTO 2	X	4	5	MA	6	X	X	OK	OK
232: 5:10:53: 60	16:11:543	5:18:483	2A-159	L	L	1	AUTO 2	X	4	5	MA	6	X	X	OK	OK
232: 5:16:13:542	18:52:784	2:39:242	2A-160	S	S	1	AUTO 2	X	X	5	MA	6	X	X	OK	OK

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INSTRUMENT OPERATION 5- 5-75 AT 18 HOURS 36 MINS 54 SECS
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FRAME COUNT	GAMRR (ARCMINS)	MAX PT EXC (ARCSEC) GAMX	GAMY	(ARCMINS) GAMRR	--NRL BIAS-- (ARCSEC) GXBI	GYBI	ANGLE (ARCMINS) -B- OPEN	-E- OPEN	ALTITUDE (KM)	Z(M) (KM)	ORBIT NUMBER
(D)	(R)	(S)	(T)	(U)			(V)	(W)	(X)	(Y)	(Z)
2A-141	-10446.00				28.75	56.25	3565.01	1801.69	441.36	351.70	1400
		.000	.000	.000	28.75	56.25					
2A-142	-10446.00				28.75	56.25	3564.98	1818.13	441.77	346.94	1400
		.000	.000	.000	28.75	56.25					
2A-143	-10446.00				28.75	56.25	3564.97	1825.51	442.15	345.03	1400
		.000	.000	.000	28.75	56.25					
2A-144	-10446.00				28.75	56.25	3564.97	1825.51	442.15	345.03	1400
		.000	.000	.000	28.75	56.25					
2A-145	-10446.00				28.75	56.25	3564.98	1823.79	442.47	346.07	1400
		.000	.000	.000	28.75	56.25					
2A-146	-10446.00				28.75	56.25	3565.00	1812.99	442.74	350.01	1400
		.000	.000	.000	28.75	56.25					
2A-147	-10446.00				28.75	56.25	3565.05	1793.22	442.94	356.62	1401
		.000	.000	.000	28.75	56.25					
2A-148	-5042.00				28.75	56.25	3566.39	1212.93	440.87	440.61	1401
		.000	.000	.000	28.75	56.25					
2A-149	-4976.00				28.75	56.25	3580.91	-57.45	440.33	439.35	1402
		.000	.000	.000	28.75	56.25					
2A-150	-4971.00				28.75	56.25	3584.48	273.82	432.67	169.85	1403
		.000	.000	.000	28.75	56.25					
2A-151	-4817.00				28.75	56.25	3595.75	-249.41	441.02	423.08	1404
		.000	.000	.000	28.75	56.25					
2A-152	-5389.00				28.75	56.25	3599.26	247.40	432.93	155.34	1404
		.000	.000	.660	28.75	56.25					
2A-153	-5144.00				28.75	56.25	3610.87	563.13	437.84	306.57	1406
		.000	.000	.000	28.75	56.25					
2A-154	-5146.00				28.75	56.25	3612.97	533.49	434.12	293.21	1406
		.000	.000	.000	28.75	56.25					
2A-155	-5146.00				28.75	56.25	3625.33	1014.11	438.01	423.41	1408
		.000	.000	.000	28.75	56.25					
2A-156	-5146.00				28.75	56.25	3625.33	1014.11	438.01	423.41	1408
		.000	.000	.000	28.75	56.25					
2A-157	-5146.00				28.75	56.25	3625.33	1014.11	438.01	423.41	1408
		.000	.000	.330	28.75	56.25					
2A-158	-5145.00				28.75	56.25	3625.79	815.32	436.22	385.08	1408
		.000	.000	.000	28.75	56.25					
2A-159	-5145.00				28.75	56.25	3625.79	815.32	436.22	385.08	1408
		.000	.000	.000	28.75	56.25					
2A-160	-5144.00				28.75	56.25	3627.03	158.64	430.95	103.18	1408
		.000	.000	.000	28.75	56.25					

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INSTRUMENT OPERATION 5- 5-75 AT 18 HOURS 36 MINS 54 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)
232: 7:34:51:145	35: 1:145	0:10: 0	2A-161	S	S	1	AUTO 2	X	X	5	MA	6	X	X	OK	OK
232: 7:35: 3:145	35:23:144	0:19:999	2A-162	L	L	1	AUTO 2	X	X	5	MA	6	X	X	OK	OK
232: 7:35:25:144	36: 4:892	0:39:748	2A-163	S	S	1	AUTO 2	X	X	5	MA	6	X	X	OK	OK
232: 7:36: 6:892	37:26:387	1:19:495	2A-164	L	L	1	AUTO 2	X	X	5	MA	6	X	X	OK	OK
232: 7:37:28:387	40: 7:657	2:39:270	2A-165	S	S	1	AUTO 2	X	X	5	MA	6	X	X	OK	OK
232: 7:40: 9:573	45:28:138	5:18:565	2A-166	L	L	1	AUTO 2	X	X	5	MA	6	X	X	OK	OK
232:11:26:13:525	26:52:523	0:38:998	2A-167	S	S	1	MAN	X	4	5	MA	6	X	HI	OK	OK
232:12:35:23:598	36:43: 94	1:19:496	2A-168	L	L	1	MAN	X	4	5	ML	6	X	HI	OK	OK
232:13:51:20:394	51:59:142	0:38:748	2A-169	S	S	1	MAN	X	4	5	MA	6	X	HI	OK	OK
232:14:34:24:518	35:44: 14	1:19:496	2A-170	L	L	1	MAN	X	4	5	MA	6	X	HI	OK	OK
232:16:58:25:635	59: 4:634	0:38:999	2A-171	S	S	1	MAN	X	4	5	MA	6	X	HI	OK	OK
232:17:41:38: 20	42:57:516	1:19:496	2A-172	L	L	1	MAN	X	X	5	MA	6	X	HI	OK	OK
232:20: 2:52:131	3:31:129	0:38:998	2A-173	S	S	1	MAN	X	4	5	MA	6	X	HI	OK	OK
232:20:49: 0: 5	50:19: 1	1:18:996	2A-174	L	L	1	MAN	X	4	5	MA	6	X	HI	OK	OK
232:23:12:24:359	13: 3:357	0:38:998	2A-175	S	S	1	MAN	X	4	5	MA	6	X	HI	OK	OK
232:23:55:50:471	57: 9:467	1:18:996	2A-176	L	L	1	MAN	X	4	5	MA	6	X	HI	OK	OK
233: 2:14:53:368	15:32:866	0:39:498	2A-177	S	S	1	MAN	X	4	5	MA	6	X	HI	OK	OK
233:11:51: 6: 56	51:16: 56	0:10: 0	2A-178	S	S	1	AUTO 1	X	4	5	MA	6	X	HI	OK	OK
233:11:51:18: 56	51:57:803	0:39:747	2A-179	S	S	1	AUTO 1	X	4	5	MA	6	X	HI	OK	OK
233:11:51:59:803	54:39: 48	2:39:245	2A-180	S	S	1	AUTO 1	X	4	5	MA	6	X	HI	OK	OK

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INSTRUMENT OPERATION 5- 5-75 AT 18 HOURS 36 MINS 54 SECS
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FRAME COUNT	GAMRR (ARCMINS)	MAX PT EAC (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)
2A-161	-5078.00				28.75	56.25	3636.33	-286.81	440.50	416.77	1410
		.000	.000	.000	28.75	56.25					
2A-162	-5078.00				28.75	56.25	3636.33	-264.53	440.47	420.29	1410
		.000	.000	.000	28.75	56.25					
2A-163	-5078.00				28.75	56.25	3636.40	-223.29	440.28	425.90	1410
		.000	.000	.000	28.75	56.25					
2A-164	-5078.00				28.75	56.25	3636.49	-144.50	439.90	433.88	1410
		.000	.000	.000	28.75	56.25					
2A-165	-5078.00				28.75	56.25	3636.65	8.19	439.26	433.88	1410
		.000	.000	.000	28.75	56.25					
2A-166	-5078.00				28.75	56.25	3636.97	294.02	438.31	433.88	1410
		.000	.000	.000	28.75	56.25					
2A-167	-5055.00				28.75	56.25	3650.38	529.81	433.06	433.88	1412
		.000	.000	.000	28.75	56.25					
2A-168	-5401.00				28.75	56.25	3653.26	1598.64	441.29	404.93	1413
		.000	.000	.000	28.75	56.25					
2A-169	-5392.00				28.75	56.25	3659.18	24.56	438.99	17.03	1413
		.000	.000	.000	28.75	56.25					
2A-170	-5390.00				28.75	56.25	3661.12	385.49	431.63	226.92	1414
		.000	.000	.000	28.75	56.25					
2A-171	-5292.00				28.75	56.25	3669.15	57.97	438.81	39.66	1415
		.000	.000	.000	28.75	56.25					
2A-172	-5291.00				28.75	56.25	3671.06	350.85	431.01	209.70	1416
		.000	.000	.000	28.75	56.25					
2A-173	-5222.00				28.75	56.25	3678.01	-145.73	439.68	433.59	1417
		.000	.000	.000	28.75	56.25					
2A-174	-5209.00				28.75	56.25	3680.16	206.90	429.73	131.63	1418
		.000	.000	.000	28.75	56.25					
2A-175	-5100.00				28.75	56.25	3686.31	167.10	438.38	109.30	1419
		.000	.000	.000	28.75	56.25					
2A-176	-5095.00				28.75	56.25	3687.92	173.83	429.29	420.59	1419
		.000	.000	.000	28.75	56.25					
2A-177	-5048.00				28.75	56.25	3688.17	6324.84	427.94	-5783.36	1421
		.000	.000	.000	28.75	56.25					
2A-178	-10215.00				25.00	55.00	3707.81	1289.54	441.21	440.60	1427
		.000	.000	.000	25.00	55.00					
2A-179	-10215.00				25.00	55.00	3707.81	1289.54	441.21	440.60	1427
		.000	.000	.000	25.00	55.00					
2A-180	-10215.00				25.00	55.00	3707.81	1289.54	441.21	440.60	1427
		.000	.000	.000	25.00	55.00					

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INSTRUMENT OPERATION 5- 5-75 AT 18 HOURS 36 MINS 54 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)	(I)	(J)	(K)	OP EXP (L)	(M)	(N)	(O)	TEMP OP (P)	TEMP CL (Q)
233:13: 9:47: 90	12:26: 82	2:38:992	2A-181	L	L	1	MAN	X	4	5	G3	6	X	HI	OK	OK
233:13:13: 5:330	13:14: 80	0: 8:750	2A-182	S	S	1	MAN	X	4	5	MA	6	X	HI	OK	OK
233:14:42:39:342	43:18:840	0:39:498	2A-183	S	S	1	MAN	X	4	5	ML	6	X	HI	OK	OK
233:15:16:54: 0	17:32:748	0:38:748	2A-184	S	S	1	MAN	X	X	5		6	X	HI	OK	OK
233:15:23:49:228	24:28:726	0:39:498	2A-185	S	S	1	MAN	X	4	5	GS	6	X	HI	OK	OK
233:15:29:36:711	30:15:709	0:38:998	2A-186	S	S	1	MAN	X	4	5	MA	6	X	HI	OK	OK
233:15:33:44:448	34:23:696	0:39:248	2A-187	S	S	1	MAN	X	4	5	MA	6	X	HI	OK	OK
233:16:15:31:840	16:10:588	0:38:748	2A-188	S	S	1	MAN	X	4	5	MA	6	X	HI	OK	OK
233:16:59: 0:391	59:39:472	0:39: 81	2A-189	S	S	1	MAN	X	4	5	GS	6	X	HI	OK	OK
233:18:35:22:206	38: 1:198	2:38:992	2A-190	L	L	1	MAN	X	4	5	MA	6	X	HI	OK	OK
233:21: 8: 6: 43	10:45:787	2:39:744	2A-191	S	S	1	MAN	X	4	5	MA	6	X	HI	OK	OK
233:23:19: 9:673	20:28:418	1:18:745	2A-192	S	S	1	MAN	X	X	5	MA	6	X	HI	OK	OK
234: 1:36:59:155	37:37:903	0:38:748	2A-193	S	S	1	MAN	X	4	5	MA	6	X	HI	OK	OK
234: 1:37:52:152	38:30:900	0:38:748	2A-194	L	L	1	MAN	X	4	5	MA	6	X	HI	OK	OK
234:12:52:37:983	55:17:474	2:39:491	2A-195	L	L	1	MAN	X	4	5	MA	6	X	HI	OK	OK
234:12:55:46:473	55:55:472	0: 8:999	2A-196	S	S	1	MAN	X	4	5	MA	6	X	HI	OK	OK
235: 0: 4:22:359	4:26:609	0: 4:250	2A-197	S	S	1	MAN	X	X	5	G3	6	X	HI	OK	OK
235: 0:55:43:276	56:22:524	0:39:298	2A-198	S	S	1	MAN	X	4	5	MA	6	X	HI	OK	OK
235: 0:57:12:271	57:51:519	0:39:248	2A-199	L	L	1	MAN	X	4	5	MA	6	X	HI	OK	OK
235:13:29: 3:658	31:43:158	2:39:500	2A-200	L	L	1	MAN	X	4	5	MA	6	X	HI	OK	OK

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INSTRUMENT OPERATION 5- 5-75 AT 18 HOURS 36 MINS 54 SECS
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FRAME COUNT	GAMRR (ARCMINS)	MAX PT EXC (ARCSEC) GAMX	GAMY	(ARCMINS) GAMRR	--NRL BIAS-- (ARCSEC) GXBI	GYBI	ANGLE (ARCMINS) -B- OPEN	-E- OPEN	ALTITUDE (KM)	Z(M) (KM)	ORBIT NUMBER
(D)	(R)	(S)	(T)	(U)			(V)	(W)	(X)	(Y)	(Z)
2A-181	-10222.00				25.00	55.00	3710.37	-143.49	439.25	433.40	1427
		.000	.000	.000	25.00	55.00					
2A-182	-10220.00				25.00	55.00	3710.55	206.22	438.48	132.73	1427
		.000	.000	.000	25.00	55.00					
2A-183	-10798.00				25.00	55.00	3711.82	-196.91	439.32	428.11	1428
		.000	.000	.000	25.00	55.00					
2A-184	-10792.00				25.00	55.00	3710.54	1415.98	439.27	430.42	1429
		.000	.000	.000	25.00	55.00					
2A-185	-10791.00				25.00	55.00	3711.73	852.85	432.54	391.21	1429
		.000	.000	.000	25.00	55.00					
2A-186	-10791.00				25.00	55.00	3712.52	233.88	428.06	146.74	1429
		.000	.000	.000	25.00	55.00					
2A-187	-10790.00				25.00	55.00	3712.68	-280.90	427.06	404.38	1429
		.000	.000	.000	25.00	55.00					
2A-188	-8877.00				25.00	55.00	3713.06	-250.07	439.37	421.38	1429
		.000	.000	.000	25.00	55.00					
2A-189	-8872.00				25.00	55.00	3713.32	589.65	430.04	312.85	1430
		.000	.000	.000	25.00	55.00					
2A-190	-5207.00				25.00	75.00	3714.52	311.15	428.15	400.29	1431
		.000	.000	.000	25.00	75.00					
2A-191	-2161.00				25.00	75.00	3714.55	1037.00	440.53	428.40	1432
		.000	.000	3.000	25.00	75.00					
2A-192	-2217.00				25.00	75.00	3714.64	-132.87	427.20	422.12	1434
		.000	.000	.000	25.00	75.00					
2A-193	-10494.00				25.00	55.00	3714.95	-108.63	438.66	435.30	1435
		.000	.000	.000	25.00	55.00					
2A-194	-10494.00				25.00	55.00	3714.98	-12.72	438.50	438.50	1435
		.000	.000	.000	25.00	55.00					
2A-195	-10183.00				25.00	55.00	3702.90	1652.73	444.18	396.80	1442
		.000	.000	.000	25.00	55.00					
2A-196	-10183.00				25.00	55.00	3702.76	1686.57	443.12	387.17	1442
		.000	.000	.000	25.00	55.00					
2A-197	-10060.00				25.00	55.00	3682.00	820.80	428.60	380.00	1448
		.000	.000	.000	25.00	55.00					
2A-198	-10586.00				25.00	55.00	3680.84	-289.75	438.82	414.61	1449
		.000	.000	.000	25.00	55.00					
2A-199	-10586.00				25.00	55.00	3680.40	-126.60	438.84	434.18	1449
		.000	.000	.000	25.00	55.00					
2A-200	189.00				25.00	55.00	3638.26	432.79	441.29	387.32	1456
		.000	.000	.000	25.00	55.00					

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INSTRUMENT OPERATION 5- 5-75 AT 18 HOURS 36 MINS 54 SECS
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SHUTTER OPEN (A)	SHUTTER CLOSE (B)	EXPOSURE TIME (C)	FRAME COUNT (D)	WVL -G- (E)	WVL -M- (F)	MULT (G)	MODE (H)	OP EXP (I)	OP EXP (J)	OP EXP (K)	OP EXP (L)	OP EXP (M)	OP EXP (N)	OP EXP (O)	TEMP OP (P)	TEMP CL (Q)
235:13:32:12:158			2A-2[illegible]1	S	S	1	MAN	X	4	5	MA	6	X	HI	OK	
	32:21:158	0: 9: 0														OK

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INSTRUMENT OPERATION 5- 5-75 AT 18 HOURS 36 MINS 54 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	GXBI	GYBI	-B- OPEN	-E- OPEN			
(D)	(R)	(S)	(T)	(U)			(V)	(W)	(X)	(Y)	(Z)
2A-201	189.00				25.00	55.00	3637.66	754.17	442.67	373.16	1456
		.000	.000	.000	25.00	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.

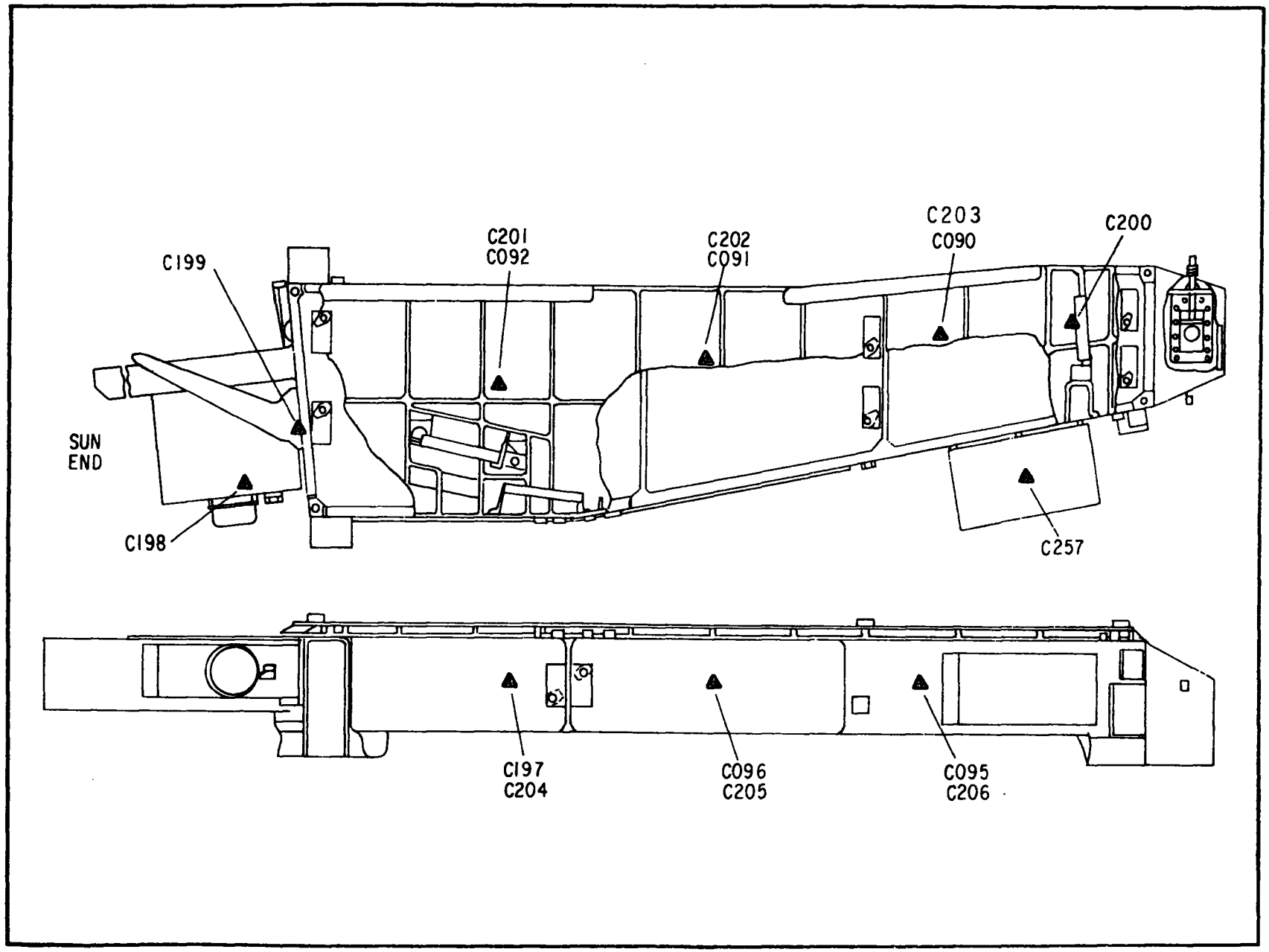

Figure 6-1. Measurement Locations for NRL-A (S082A)

S282A-EDB
TEMPERATURE DATA
PAGE 1

5- 5-75 AT 18 HOURS 36 MINS 54 SECS

		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)
2A-001	218:22:32:53:533	67.91	68.71	68.71	68.10	69.08	68.96	67.76	.74	.38	.46	-.26	.03	-.02
2A-002	219:14: 3:43: 77	67.36	68.28	68.34	67.60	68.78	68.50	66.78	.84	.44	.56	-.20	.08	-.02
2A-003	219:14:10:15:307	67.30	68.34	68.34	67.65	68.74	68.47	66.89	.86	.48	.56	-.16	.08	-.02
2A-004	219:15:44:25:786	67.60	68.34	68.37	67.63	68.84	68.62	67.29	.81	.41	.56	-.22	.07	-.04
2A-005	219:18:14:49:282	67.91	68.62	68.62	68.13	69.08	68.67	68.62	.75	.34	.44	-.26	.05	-.10
2A-006	219:18:46:35:267	68.04	68.62	68.78	68.13	69.14	68.90	68.85	.74	.36	.41	-.33	.02	-.10
2A-008	219:19:59:42:310	68.22	68.84	68.84	68.34	69.21	68.96	69.14	.74	.35	.37	-.28	.03	-.10
2A-011	219:20: 4: 7:797	68.22	68.84	68.87	68.34	69.21	69.02	69.31	.73	.36	.38	-.30	.05	-.10
2A-012	220: 1:54: 3: 48	68.28	68.90	68.90	68.37	69.27	69.08	69.08	.74	.34	.38	-.26	.01	-.09
2A-014	220:14:43:41:101	67.79	68.62	68.65	68.04	68.96	68.64	67.47	.77	.40	.49	-.22	.03	-.02
2A-016	220:17:52:21:817	68.03	68.74	68.62	68.13	69.11	68.84	68.16	.77	.36	.41	-.22	.01	-.06
2A-017	220:20:32: 1:603	68.22	68.84	68.84	68.41	69.27	68.96	69.08	.74	.34	.40	-.26	.02	-.10
2A-020	221: 1:10:28:827	68.34	68.96	68.90	68.53	69.24	69.02	68.68	.73	.32	.38	-.25	-.05	-.09
2A-022	221:15:20:32:429	67.73	68.59	68.59	67.91	68.96	68.78	67.29	.79	.40	.50	-.26	.01	-.03
2A-023	221:15:33:14:889	67.73	68.59	68.59	67.97	69.08	68.74	67.29	.79	.40	.48	-.25	.02	-.02
2A-024	221:15:46: 7:858	67.76	68.59	68.59	67.97	68.96	68.84	67.52	.74	.41	.49	-.25	.04	-.05
2A-025	221:15:53:20:586	67.79	68.59	68.62	67.97	68.96	68.84	67.70	.79	.40	.48	-.26	.03	-.02
2A-035	221:15:58:20:570	67.79	68.65	68.59	67.97	68.96	68.78	67.70	.79	.40	.46	-.20	.03	-.04
2A-036	221:19:49:18:588	67.85	68.62	68.53	68.00	69.02	68.71	67.76	.79	.40	.48	-.26	.01	-.04
2A-037	221:19:58:58:808	67.85	68.59	68.50	68.04	69.02	68.78	67.76	.79	.40	.48	-.22	.03	-.04
2A-038	221:20:17:24:346	67.85	68.62	68.59	68.04	68.90	68.78	67.76	.78	.38	.48	-.26	.03	-.04
2A-039	221:20:33:48:550	67.85	68.62	68.59	68.04	68.99	68.74	68.04	.78	.40	.48	-.25	.04	-.02
2A-040	222:22:12:45:605	67.60	68.53	68.50	67.91	68.84	68.62	67.29	.81	.41	.52	-.24	.03	-.01
2A-041	222:22:16:54:607	67.60	68.44	68.44	67.91	68.87	68.62	67.29	.81	.41	.49	-.22	.05	.01
2A-042	223: 1:17:32:387	67.76	68.59	68.59	67.97	68.96	68.74	67.93	.74	.38	.48	-.24	.03	-.05
2A-044	223: 1:57:35:857	67.85	68.59	68.62	68.00	68.87	68.84	68.16	.77	.37	.46	-.29	.03	-.05
2A-045	223:13:45: 5:866	67.60	68.59	68.53	67.79	68.90	68.71	67.24	.81	.40	.51	-.21	.05	-.01
2A-047	223:16:58:33:617	67.88	68.62	68.62	68.10	69.02	68.81	68.16	.77	.40	.46	-.26	.02	-.07
2A-050	223:17:30:28:942	67.91	68.71	68.62	68.10	69.08	68.84	68.22	.74	.40	.44	-.20	.01	-.06
2A-051	223:18:32:32:880	68.00	68.78	68.74	68.13	69.08	68.96	68.62	.74	.38	.42	-.20	.03	-.09
2A-052	223:19:57:26:496	68.10	68.78	68.78	68.25	69.11	68.96	69.08	.74	.36	.40	-.27	.03	-.09
2A-053	223:20: 3: 4:513	68.30	68.88	68.87	68.43	69.15	69.02	69.36	.71	.31	.36	-.25	.01	-.10
2A-054	223:20: 8:13:812	68.34	68.96	68.96	68.47	69.33	69.08	69.54	.73	.33	.40	-.25	.01	-.10
2A-055	223:21:32:39:952	68.59	69.11	68.08	68.74	69.45	69.27	70.29	.73	.32	.28	-.26	-.04	-.10
2A-056	223:21:59:32:535	68.59	69.08	69.08	68.77	69.39	69.11	70.23	.69	.32	.32	-.30	-.02	-.10
2A-057	224: 0:38:18:543	68.62	69.11	69.08	68.78	69.45	69.21	69.66	.71	.28	.32	-.32	.01	-.04
2A-059	224: 1:12:10:406	68.59	69.11	69.08	68.78	69.48	69.24	69.66	.69	.29	.32	-.30	-.02	-.10
2A-060	224:23: 4:58:883	68.41	69.38	69.02	68.59	69.33	69.14	69.83	.71	.32	.34	-.28	.03	-.10
2A-061	225: 1:29:27:850	68.78	69.21	69.21	68.87	69.51	69.33	70.35	.67	.27	.29	-.30	-.04	-.12

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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)
2A-063	225: 1:37:42:528	68.71	69.21	69.21	68.96	69.51	69.33	70.46	.66	.27	.29	-.28	-.02	-.12
2A-065	225:14:17:44:299	67.85	68.78	68.84	68.13	69.08	69.08	67.58	.74	.36	.48	-.25	.04	.01
2A-066	225:14:19:33:304	67.88	68.62	68.84	68.13	69.14	68.96	67.41	.74	.36	.48	-.25	.04	.01
2A-067	225:20:16:20:561	68.41	69.05	69.08	68.59	69.36	69.18	68.96	.70	.32	.34	-.30	-.02	-.09
2A-068	225:20:20:25: 75	68.41	69.02	69.08	68.59	69.36	69.27	69.02	.69	.32	.38	-.30	-.02	-.09
2A-069	225:20:42:46:475	68.41	69.08	69.08	68.59	69.33	69.39	69.31	.69	.29	.36	-.33	-.02	-.09
2A-071	226: 0:50:44:211	68.78	69.27	69.27	68.93	69.58	69.48	70.35	.65	.24	.27	-.39	-.04	-.12
2A-073	226:13:14:50:830	67.97	68.74	68.84	68.13	69.11	69.02	67.64	.73	.36	.45	-.25	.02	-.02
2A-074	226:13:19:20:230	67.97	68.84	68.87	68.13	69.11	69.05	67.70	.74	.37	.48	-.26	.03	-.02
2A-075	226:13:26:19:625	67.97	68.84	68.87	68.13	69.11	69.02	67.70	.74	.38	.45	-.24	.01	.01
2A-077	226:13:56:11: 24	67.97	68.84	68.96	68.13	69.08	69.08	67.93	.73	.35	.44	-.25	.01	.01
2A-078	226:19:23:32:303	68.62	69.27	69.24	68.87	69.51	69.45	70.23	.66	.27	.27	-.30	-.02	-.10
2A-080	227: 1:41:54:717	68.84	69.39	69.36	69.08	69.58	69.51	70.46	.57	.24	.24	-.33	-.09	-.10
2A-082	227: 1:50:54:994	68.87	69.33	69.39	68.96	69.58	69.51	70.35	.65	.24	.24	-.26	-.09	-.10
2A-084	227:14:20:46:917	68.00	68.84	68.87	68.13	69.11	69.08	67.70	.74	.36	.48	-.25	.01	-.05
2A-086	227:14:30:24:599	67.97	68.78	68.93	68.13	69.11	69.08	67.81	.73	.36	.44	-.30	.03	-.02
2A-087	227:15:40:23:265	68.10	68.84	69.02	68.28	69.21	69.11	68.50	.67	.36	.40	-.27	.01	-.06
2A-088	227:16:15:15:552	68.13	68.96	69.08	68.34	69.27	69.11	68.73	.70	.34	.40	-.27	.01	-.06
2A-089	227:17:10:57:515	68.34	68.99	69.11	68.47	69.27	69.33	69.08	.66	.32	.37	-.28	-.02	-.08
2A-090	227:17:54:21:528	68.41	69.08	69.11	68.59	69.33	69.39	69.43	.67	.32	.36	-.33	-.04	-.10
2A-091	227:19: 9:11:658	68.59	69.11	69.33	68.78	69.45	69.45	69.77	.66	.28	.32	-.37	-.09	-.09
2A-092	227:19:31:28:506	68.62	69.11	69.27	68.78	69.45	69.45	70.00	.63	.28	.28	-.37	-.02	-.08
2A-093	227:21:53:18:823	68.87	69.33	69.45	68.99	69.58	69.58	70.46	.65	.24	.24	-.38	-.06	-.12
2A-094	227:21:57:39:835	68.84	69.33	69.45	69.02	69.58	69.58	70.46	.62	.24	.24	-.37	-.09	-.12
2A-095	228: 1: 5: 1:326	69.08	69.48	69.51	69.24	69.70	69.61	70.92	.60	.23	.23	-.42	-.05	-.14
2A-097	228:13:32: 6:498	68.13	68.96	69.08	68.34	69.27	69.21	68.50	.69	.32	.40	-.30	.01	-.08
2A-099	228:19:41: 6:913	68.62	69.24	69.33	68.87	69.58	69.45	69.66	.65	.25	.32	-.34	-.05	-.08
2A-100	229: 1:51:13: 25	69.08	69.58	69.58	69.11	69.64	69.70	70.81	.57	.23	.23	-.35	-.09	-.10
2A-101	229: 1:59:46: 51	69.08	69.48	69.58	69.21	69.70	69.61	70.92	.57	.23	.23	-.37	-.06	-.13
2A-102	229:11:33: 7:440	68.22	68.96	69.08	68.41	69.27	69.21	68.16	.66	.32	.40	-.32	-.02	.01
2A-104	229:11:43: 1:720	68.13	68.96	69.08	68.37	69.27	69.27	68.04	.66	.34	.40	-.34	-.02	-.04
2A-106	229:16:14:56:361	68.62	69.27	69.36	68.78	69.48	69.55	69.89	.65	.24	.32	-.26	-.02	-.10
2A-108	229:17:26:27: 39	68.78	69.36	69.45	68.90	69.58	69.58	70.29	.62	.24	.24	-.26	-.06	-.12
2A-109	229:19: 1: 9:687	68.90	69.39	69.51	69.08	69.61	69.61	70.46	.57	.24	.24	-.35	-.05	-.10
2A-110	229:19:19:42:995	68.96	69.42	69.58	69.08	69.61	69.61	70.69	.60	.24	.23	-.35	-.06	-.10
2A-111	229:20:34: 9:104	69.02	69.45	69.58	69.11	69.70	69.70	70.92	.56	.22	.23	-.42	-.09	-.12
2A-112	229:20:51:32:389	69.02	69.48	69.58	69.21	69.61	69.61	70.81	.57	.21	.23	-.35	-.06	-.12
2A-113	229:23:36:35:482	68.99	69.36	69.48	69.11	69.64	69.58	70.06	.63	.21	.23	-.35	-.09	-.10
2A-114	230: 1: 9:50:431	68.96	69.45	69.58	68.99	69.61	69.61	70.58	.60	.23	.23	-.38	-.09	-.10

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TEMPERATURE DATA 5- 5-75 AT 18 HOURS 36 MINS 54 SECS
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		ABSOLUTE TEMPERATURES							DIFFERENCE TEMPERATURES					
		BASE TEMP (57 TO 83 DEGF)			SIDE TEMP (57 TO 83 DEGF)		GRATING (63 TO 83 DEGF)		LID - BASE (-5 TO 5 DEGF)			SIDE - SIDE (-5 TO 5 DEGF)		
FRAME	TIME	REAR (C090)	CENT (C091)	FNT (C092)	REAR (C095)	CENT (C096)	FNT (C197)	(C200)	F CENT (C201)	CENT (C202)	R CENT (C203)	F CENT (C204)	CENT (C205)	R CENT (C206)
2A-116	230: 1:21:29:716	68.93	69.39	69.58	69.08	69.70	69.61	70.35	.57	.22	.23	-.37	-.09	-.09
2A-117	230:12: 2:34: 60	68.10	68.99	69.08	68.34	69.24	69.24	67.93	.69	.34	.41	-.30	.01	.01
2A-118	230:13:37:45:842	68.28	68.96	69.21	68.47	69.27	69.36	68.73	.66	.32	.40	-.34	-.05	-.09
2A-120	230:15:12:54:518	68.47	69.27	69.33	68.59	69.42	69.51	69.43	.66	.28	.37	-.28	.01	-.10
2A-121	230:16:42: 7:592	68.62	69.33	72.04	68.90	69.51	69.61	70.00	.63	.24	.29	-.34	-.02	-.13
2A-122	230:18:15:53:473	68.84	69.36	69.48	68.96	69.61	69.64	70.35	.59	.24	.24	-.39	-.09	-.13
2A-123	230:19:48:53:474	68.93	69.45	69.58	69.11	69.61	69.70	70.69	.57	.23	.23	-.37	-.06	-.13
2A-124	230:21:21:59:701	69.11	69.58	69.61	69.27	69.76	69.82	70.92	.57	.23	.21	-.38	-.09	-.13
2A-125	230:22:54: 8:519	69.11	69.58	69.61	69.33	69.82	69.82	71.15	.55	.21	.21	-.38	-.09	-.13
2A-126	231: 0:28:54:762	69.21	69.61	69.73	69.39	69.85	69.82	71.21	.56	.21	.18	-.35	-.08	-.13
2A-128	231:13:17:44:660	68.28	69.08	69.27	68.47	69.36	69.45	68.73	.65	.32	.38	-.37	-.09	-.10
2A-129	231:13:38:30:716	68.34	69.08	69.33	68.47	69.33	69.48	68.85	.65	.32	.36	-.35	-.02	-.09
2A-130	231:15:57:36: 56	68.50	69.21	69.39	68.62	69.48	69.51	69.08	.65	.25	.36	-.35	-.05	-.09
2A-131	231:16:17:10:424	68.53	69.11	69.36	68.71	69.45	69.51	69.14	.63	.27	.36	-.34	.01	-.06
2A-137	231:16:21:40:160	68.50	69.21	69.48	68.62	69.48	69.48	69.14	.62	.28	.34	-.35	-.04	-.06
2A-143	231:16:27:10:393	68.53	69.21	69.39	68.65	69.48	69.51	69.08	.65	.28	.32	-.39	-.04	-.04
2A-148	231:16:39:31:610	68.53	69.21	69.39	68.62	69.45	69.58	69.14	.65	.27	.33	-.35	-.05	-.06
2A-149	231:19:10:11:201	68.71	69.33	69.51	68.87	69.58	69.70	69.89	.57	.24	.28	-.29	-.05	-.09
2A-150	231:19:55:37:827	68.84	69.33	69.51	68.96	69.58	69.70	70.06	.60	.24	.28	-.34	-.06	-.10
2A-151	231:22:15:11:185	68.99	69.48	69.61	69.11	69.67	69.82	70.69	.57	.23	.23	-.37	-.06	-.12
2A-152	231:23: 1:53: 58	69.08	69.51	69.70	69.11	69.82	69.85	70.81	.56	.21	.21	-.38	-.06	-.12
2A-153	232: 1:29:50:659	69.21	69.61	69.82	69.33	69.85	69.85	71.15	.54	.23	.17	-.39	-.09	-.13
2A-154	232: 2: 6:56: 53	69.21	69.64	69.76	69.33	69.82	69.95	70.98	.56	.20	.19	-.42	-.09	-.14
2A-155	232: 5: 8:15:818	69.11	69.58	69.70	69.33	69.76	69.85	70.58	.56	.21	.23	-.37	-.09	-.10
2A-160	232: 5:16:13:542	69.11	69.58	69.73	69.27	69.82	69.85	70.52	.56	.19	.20	-.35	-.09	-.10
2A-161	232: 7:34:51:145	68.96	69.55	69.61	69.14	69.73	69.73	70.00	.56	.23	.24	-.34	-.10	-.09
2A-166	232: 7:40: 9:573	69.08	69.51	69.61	69.11	69.76	69.70	70.00	.57	.23	.24	-.42	-.08	-.09
2A-167	232:11:26:13:525	68.71	69.33	69.51	68.87	69.58	69.58	69.14	.60	.24	.29	-.34	-.04	-.06
2A-168	232:12:35:23:598	68.65	68.31	69.45	68.81	69.51	69.76	69.14	.59	.24	.32	-.38	-.04	-.06
2A-169	232:13:51:20:394	68.78	69.33	69.58	68.84	69.58	69.70	69.71	.58	.24	.32	-.38	-.02	-.09
2A-170	232:14:34:24:518	68.84	69.33	69.58	68.90	69.58	69.73	70.00	.57	.24	.29	-.34	-.05	-.10
2A-171	232:16:58:25:635	69.02	69.51	69.76	69.11	69.76	69.82	70.81	.56	.23	.25	-.37	-.09	-.12
2A-172	232:17:41:38: 20	69.14	69.58	69.82	69.27	69.76	69.82	71.15	.54	.20	.19	-.38	-.10	-.13
2A-173	232:20: 2:52:131	69.27	69.61	69.82	69.39	69.85	69.85	71.27	.54	.17	.19	-.39	-.09	-.14
2A-174	232:20:49: 0: 5	69.33	69.61	69.82	69.45	69.85	69.98	71.38	.52	.19	.17	-.37	-.10	-.12
2A-175	232:23:12:24:359	69.45	69.76	69.82	69.51	69.95	70.01	71.61	.53	.17	.15	-.39	-.10	-.14
2A-176	232:23:55:50:471	69.45	69.82	69.98	69.58	69.88	70.07	71.73	.52	.19	.15	-.42	-.10	-.17
2A-177	233: 2:13:11:873	69.25	69.39	69.61	69.45	69.66	69.89	70.69	.56	.17	.24	-.46	-.03	-.09
2A-178	233:11:51: 6: 56	68.25	69.08	69.33	68.41	69.39	69.51	68.16	.65	.33	.40	-.33	-.04	.01
2A-181	233:13: 9:47: 90	68.34	69.11	69.42	68.53	69.36	69.58	68.68	.62	.29	.37	-.35	-.02	-.06

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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)
2A-183	233:14:42:39:342	68.53	69.21	69.51	68.62	69.51	69.61	69.66	.60	.27	.32	-.42	-.04	-.09
2A-184	233:15:16:54: 0	68.62	69.27	69.58	68.78	69.51	69.70	69.94	.60	.24	.32	-.42	-.06	-.10
2A-185	233:15:23:49:228	68.62	69.33	69.58	68.84	69.48	69.70	69.89	.60	.25	.32	-.43	-.06	-.10
2A-186	233:15:29:36:711	68.65	69.33	69.58	68.84	69.51	69.76	69.89	.60	.27	.29	-.42	-.09	-.10
2A-187	233:15:33:44:448	68.62	69.39	69.56	68.78	69.58	69.61	70.00	.58	.25	.28	-.42	-.04	-.10
2A-188	233:16:15:31:840	68.90	69.39	69.61	68.96	69.58	69.76	70.12	.60	.24	.27	-.43	-.06	-.10
2A-189	233:16:59: 0:391	68.84	69.51	69.61	68.99	69.61	69.82	70.69	.57	.24	.24	-.42	-.09	-.10
2A-190	233:18:35:22:206	69.05	69.51	69.76	69.21	69.70	69.88	71.61	.56	.23	.23	-.42	-.09	-.12
2A-191	233:21: 8: 6: 43	69.33	69.70	69.82	69.42	69.85	70.01	71.73	.53	.20	.20	-.37	1.19	.20
2A-192	233:23:19: 9:673	69.39	69.70	69.85	69.51	69.95	70.01	71.44	.50	.19	.15	-.45	-.10	-.12
2A-193	234: 1:36:59:155	69.48	69.82	69.85	69.58	69.95	70.07	71.61	.52	.15	.15	-.42	-.12	-.10
2A-195	234:12:52:37:983	68.22	69.08	69.27	68.41	69.33	69.45	68.16	.65	.30	.40	-.37	-.02	-.05
2A-197	235: 0: 4:22:359	68.71	69.36	69.61	68.87	69.58	69.82	69.83	.56	.23	.28	-.43	-.06	-.09
2A-198	235: 0:55:43:276	68.78	69.36	69.70	68.96	69.61	69.82	70.06	.57	.25	.27	-.42	-.04	-.10
2A-200	235:13:29: 3:658	68.22	69.08	69.36	68.41	69.33	69.51	68.62	.65	.30	.38	-.26	-.02	-.04

Ball