

# 680

STS-51F

SOUP SOLAR WHITE-LIGHT IMAGES  
85-063A-08A

SOURCE CODE TO READ SOUP DATA  
85-063A-08B

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## **1. INTRODUCTION:**

The documentation for this data set was originally on paper, kept in NSSDC's Data Set Catalogs (DSCs). The paper documentation in the Data Set Catalogs have been made into digital images, and then collected into a single PDF file for each Data Set Catalog. The inventory information in these DSCs is current as of July 1, 2004. This inventory information is now no longer maintained in the DSCs, but is now managed in the inventory part of the NSSDC information system. The information existing in the DSCs is now not needed for locating the data files, but we did not remove that inventory information.

The offline tape datasets have now been migrated from the original magnetic tape to Archival Information Packages (AIP's).

A prior restoration may have been done on data sets, if a requestor of this data set has questions; they should send an inquiry to the request office to see if additional information exists.

## 2. ERRATA/CHANGE LOG:

NOTE: Changes are made in a text box, and will show up that way when displayed on screen with a PDF reader.

*When printing, special settings may be required to make the text box appear on the printed output.*

Version	Date	Person	Page	Description of Change
01				
02				

3 LINKS TO RELEVANT INFORMATION IN THE ONLINE NSSDC INFORMATION SYSTEM:

<http://nssdc.gsfc.nasa.gov/nmc/>

[NOTE: This link will take you to the main page of the NSSDC Master Catalog. There you will be able to perform searches to find additional information]

4. CATALOG MATERIALS:

- a. Associated Documents      To find associated documents you will need to know the document ID number and then click here.  
<http://nssdcftp.gsfc.nasa.gov/miscellaneous/documents/>

- b. Core Catalog Materials

REQ. AGENT  
JPB

ACQ. AGENT  
DAB

STS-51F

SOUP SOLAR WHITE-LIGHT IMAGES

85-063A-08A SOVI-00014

This data set catalog contains 5 Soup White-Light Images data tapes. The tapes are 9 track, multi-filed, 6250 BPI and written in the VAX/VMS COPY format.

<u>D#</u>	<u>C#</u>	<u># of Files</u>
D-79173	C-27520	1266
D-79174	C-27521	1392
D-79175	C-27522	942
D-79176	C-27523	996
D-79177	C-27524	249

REQ. AGENT  
JPB

ACQ. AGENT  
DAB

STS-51F

SOURCE CODE TO READ SOUP DATA

85-063A-08B SOVI-00010

This data set catalogue contains 1 tape of source codes for reading the data files in data set 85-063A-08A. The tape is 9 track, 6250 BPI, ASCII and written in the VAX/VMS COPY format. The tape contains 5 sets of source code: RCCREAD.FOR, RCCREAD.OBJ, RCCREAD\_512.FOR, RCCREAD\_512.OBJ AND FORD.IDL.

D-79178

C-27525

SOUP WHITE LIGHT DIGITAL MOVIES

K. Topka, O/9130, B/256 Last rev. 4-20-87

Files	Subject	Start (D217/1985)	Stop (D217/1985)	Repeat	Frames	Rev	Scale (arcs /pixel)
D-79174 C-27521	C00002-167.RCC	Pores	19:10:35	19:38:05	10s	166	110 0.23
D-79175 C-27522	C00400-565.RCC	Sunspot	19:10:35	19:38:05	10s	166	110 0.21
D-79173 C-27520	C18N022-139.RCC (1)	Sunspot	19:24:01	19:28:01	2s	118	110 0.15
D-79173 C-27520	C20N001-166.RCC (2)	Quiet Sun	19:10:35	19:38:05	10s	166	110 0.16
D-79173 C-27520	C23N004-084.RCC (3)	Upwelling	19:22:45	19:25:25	2s	81	110 0.16
D-79173 C-27520	C25N001-008.RCC	Sunspot	16:33:18	16:41:56	64s	8	108 0.15
D-79173 C-27520	C25N009-029.RCC	Sunspot	17:47:27	18:13:26	1rr	21	109 0.15
D-79173 C-27520	C25N030-035.RCC	Sunspot	21:01:59	21:08:08	64s	6	111 0.15
D-79174 C-27521	C26N001-054.RCC	Limb	14:59:51	15:11:33	13s	54	107 ?
D-79174 C-27521	C27N001-010.RCC	Limb (low res)	15:04:16	15:06:16	13s	10	107 ?
D-79174 C-27521	C28N001-056.RCC (4)	Quiet Sun (low res)	19:10:35	19:38:05	30s	56	110 ?
D-79174 C-27521	C29N001-178.RCC (5)	AR 4682	19:10:35	19:40:56	10s	168	110 0.27
D-79175 C-27522	C32N001-010.RCC	Sunspot	19:10:35	19:38:05	4s	10	110 ?
D-79175 C-27522	C33N001-138.MRC	Quiet Sun	19:10:35	19:38:05	4s	138	110 ?
D-79176 C-27523	C47AQ001-083.RCC	Quiet Sun	19:10:35	19:38:05	20s	83	110 ?
D-79176 C-27523	C47BQ001-083.RCC	Pores	19:10:35	19:38:05	20s	83	110 ?
D-79177 C-27524	C47Q001-083.RCC	Full field	19:10:35	19:38:05	20s	83	110 ?
D-79176 C-27523	C51N001-166.RCC	Sunspot	19:10:35	19:38:05	10s	166	110 ?

- (1) First frame (19:24:01) (19:24:03) repeated 10 times (C18N000-009.RCC). second frame (19:24:03) repeated 13 times (C18N010-C18N021.RCC, C19N023.RCC). C18N022.RCC is a copy of C18N001.RCC.
- (2) Movies 20 and 23 are the same scale and region with a 66 pixel shift in Y.
- (3) First 3 frames are the sunspot at same magnification (time 19:22:45). Next 81 frames are of the upwelling.
- (4) This sequence has a large field of view that has vignetting.
- (5) Last 10 frames are a jitter test. Two frames (19:40:46,19:40:56) were added.

Rev number refers to the Spacelab orbit number.

Lockheed Palo Alto Research Laboratories

Zoe A. Frank  
Solar Physics, Dept. 91-30, B256  
3251 Hanover Street  
Palo Alto, CA 94304  
(415) 424-4009

August 11, 1988

Dr. Sang Kim  
Code 633  
GSFC/NASA  
Greenbelt, MD 20771

Dear Dr. Kim:

Here are the SOUP (Solar Optical Universal Polarimeter) data files and documentation that were promised per our telephone conversation on August 10. The package contains the following information:

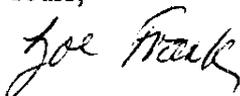
Five tapes of processed data files (6250 BPI, VAX/VMS COPY format) - 85-03A-08A  
One tape of source codes for reading the data files B  
One 16mm movie of a segment of Spacelab II data C  
(as an example of the raw data taken on board).

We have also sent the documentation listed below.

Reading the processed data files  
List of processed file included  
List of available white light film data  
Report on SOUP inflight anomalies  
Data Flow diagram  
SOUP instrument diagram  
Spacelab II Fine Guider information  
Spacelab II IPS (Instrument Pointing System) information  
Information describing jitter in the IPS and SOUP Fine Guider compensation  
SOUP (Spacelab II, Experiment #8) instrument characteristics  
SOUP experiment description  
Copy of the Preliminary Science Report  
List of published papers regarding SOUP data  
Copies of selected science papers

Please note that this is a preliminary data shipment. There is additional information and documentation which is to be sent in September. Please contact me if any problems are encountered.

Yours,



Zoe A. Frank



Research and Development  
3251 Hanover Street, Palo Alto, California 94304-1191

In reply refer to:  
IMSC/F275736

11 August 1988

Procurement Office  
National Aeronautics and Space Administration  
George C. Marshall Space Flight Center  
Marshall Space Flight Center, AL 35812

Attention: Tim Crabb, Code AP32G  
Contracts Office

Subject: Contract NAS8-32805

Reference: (a) Contract Article 3.9 Final Report/  
Scientific Data Analysis  
  
(b) Telecon W. Jaynes/IMSC and T. Crabb/NASA  
12 August 1988

Enclosure: (a) Letter Z. A. Frank/IMSC to Dr. S. Kim/NASA dated  
11 August 1988

1. Pursuant to the reference (a) contract requirement, the contractor has forwarded data files and documentation to the National Space Science Data Center (NSSDC) at Goddard Space Flight Center. Enclosure (1) is a list of this material.

2. If there are any questions regarding this submittal please contact Paul Bull at (415) 424-2007 or Zoe A. Frank at (415) 424-4009.

LOCKHEED MISSILES & SPACE COMPANY, INC.  
Research & Development Division

P. R. Bull  
Contract Administration

PRB:bw

cc: National Aeronautics and Space Administration  
National Space Science Data Center  
Goddard Space Flight Center  
Greenbelt, MD 20771  
ATTN: Dr. Sang Kim, Code 633  
w/encl: (1) Letter Z. A. Frank/IMSC to Dr. S. Kim/NASA  
8/11/88  
(2) Experiment Data, Data files and Documentation

M/20 -1

85-063A-08A

85-063A-08B

The Solar Optical Universal Polarimeter experiment was flown in July of 1985 on board the Spacelab II shuttle mission. The SOUP registered files (\*.RCC files), which are found on these tapes, are 256x256 integer, direct access files containing image data. The only exception to this is the C47Q\*\*\*.RCC sequence which consists of a 512x512 integer array. Since white light photographic data was the highest quality original data acquired by SOUP, the registered files were created by the following process.

First, the film data was digitized into a 512x512 image array using a CCD camera system. Images were registered, or corrected to remove the effects of solar rotation. Dust and irregularities in the optics were corrected for by dividing out flat field images digitized with no film in the light path. Corrections were also made for bad pixels and irregularities in the CCD by subtracting dark current images of the CCD (i.e., with no light passing through the system). Finally, the 512x512 array was compressed into 256x256 format by averaging groups of four pixels. The C47Q\*\*\*.RCC sequence is a mosaic of four 256x256 images covering the full SOUP field of view. This process is shown in the data flow diagram which is included in this package. Header information is loaded into the first 512 bytes of each data file. We refer to these files as "F0" files.

The following code is a simple FORTRAN subroutine which, given a file name specification, will load the data from disk into a 256x256 integer array.

```
      SUBROUTINE RCCREAD (FNAM,HEAD,ARR)
      C TO READ REGISTERED CCD DIGITIZED FILES
      C FNAM IS CHARACTER STRING CONTAINING FILENAME (PASSED)
      C HEAD IS A 512 BYTE ARRAY CONTAINING HEADER INFORMATION
      C ARR IS THE 256x256 INTEGER*2 IMAGE ARRAY (RETURNED)
      BYTE HEAD(512)
      INTEGER*2 ARREC(256),ARR(256,256)
      CHARACTER*(*) FNAM
      OPEN(UNIT=1,NAME=FNAM,STATUS='OLD',ACCESS='DIRECT',
1 RECL=128,ERR=999,READONLY)
      READ(1,REC=1,ERR=998) HEAD
      DO I=1,256
          READ(1,REC=I+1,ERR=998) ARREC
          DO J=1,256
              ARR(J,I)=ARREC(J)
          ENDDO
      ENDDO
      GO TO 997
999  TYPE *, 'OPEN ERROR'
      GO TO 997
998  TYPE *, 'READ ERROR'
997  CLOSE(UNIT=1)
      RETURN
      END
```

Note: The 512x512 integer arrays in the files called C47Q\*.RCC may be read in as follows:

```

      SUBROUTINE RCCREAD (FNAM,HEAD,ARR)
C   TO READ REGISTERED CCD DIGITIZED FILES
C   FNAM IS CHARACTER STRING CONTAINING FILENAME (PASSED)
C   HEAD IS A 512 BYTE ARRAY CONTAINING HEADER INFORMATION
C   ARR IS THE 512x512 INTEGER*2 IMAGE ARRAY (RETURNED)
      BYTE HEAD(512)
      INTEGER*2 ARREC(256),ARR(512,512)
      CHARACTER*(*) FNAM
      OPEN(UNIT=1,NAME=FNAM,STATUS='OLD',ACCESS='DIRECT',
1     RECL=128,ERR=999,READONLY)
      READ(1,REC=1,ERR=998) HEAD
      DO I=1,512
         K=I*2
         READ(1,REC=K,ERR=998) ARREC
         DO J=1,256
            ARR(J,I)=ARREC(J)
         ENDDO
         READ(1,REC=K+1,ERR=998) ARREC
         DO J=1,256
            ARR(J+256,I)=ARREC(J)
         ENDDO
      ENDDO
      GO TO 997
999  TYPE *, 'OPEN ERROR'
      GO TO 997
998  TYPE *, 'READ ERROR'
997  CLOSE(UNIT=1)
      RETURN
      END

```

The source codes for these routines are included on magnetic tape along with the IDL procedure FORD.IDL which may be used to read the SOUP data files.

Z. Frank, O/9130, B256, Last rev. 7/18/88

## New Standard (F0) Files

Files with the new format are a kind of general data array. A file can contain different types of data (byte, word, longword, F\_floating or D\_floating) and can have up to 16 dimensions (although images have only two). Each file also has a header containing the type and size information, as well some text.

The format itself:

The files are direct access files with 512 byte records (compatible with the "old standard"). The first record is a 512 byte header containing the following fields:

Byte(s)	Values
0-3	Sync longword (\$AAAA5555)
4	Format code (future expansion) def=0
5	Source (future expansion) def=0
6	Number of header blocks (min of 1)
7	Data type (1 =I*2, 2 =I*4, 3 =R*4)
8	Number of dimensions (max of 16)
9-191	Unused (free for other parameters)
192-255	Size of each dimension (longwords)
256-511	Header text. Lines separated by CR (13). First null in text is end of text.

After header block(s) (there can be more than one), data comes packed sequentially, with the first index varying most rapidly (as in Fortran). I like to call this particular format definition "F0" (note that this is "F zero"), so we could call such files "F0 files". Seems better than referring to them as "new standard" all the time.

F0 files can be read into IDL using the function F0, defined in FORD.IDL. It is used as follows: Do

```
IDL>.RUN FORD.IDL
```

once to compile the function, then do

```
IDL>X = F0(name)
```

or

```
IDL>X = F0(name,header)
```

to read the data from the file "name" into IDL variable X. If header is specified, it will return with the data from the file header. Header will be a BYTE array, NOT a string, so may be difficult to deal with. Whenever F0 reads a file, it will type the header text on the terminal.

## SOUP White Light Film from Spacelab-2

### Summary of Available Data

Ken Topka  
Dept 91-30/B255  
File: ORION::DSK1:[TOPKA.SOUP]SOUPWLF.TEX  
Dec 12, 1985

This is a summary of the available white light film from SOUP. It is based on notes and log sheets written and compiled by Ted Tarbell, and by a visual inspection of a complete fine-grain positive copy of the original flight film by Ken Topka.

#### REV 100:

SOUP originally acquired the sun on an undefined quiet region. About 11 minutes later AR 4682 was acquired and the pointing remained there for the rest of this orbit. The IPS was probably moving around the sun for much if not all of this first 11 minutes. The exposure factor was changed from 6 to 8 just after 04:25:18 UT, and remained there until the end. The WL film camera was left on after the IPS lost optical hold of the sun at 04:36:44, which is very close to sunset.

Target on sun: Quiet Sun (on disk)  
WL camera on time: 217/04:01:22  
WL camera off time: 217/04:12:10  
Elapsed time (sec): 648  
Repetition time: 2 sec  
Total number of frames: 325  
Exposure factor: 6  
Limb guider status: Off  
Comments: Crew was probably searching for AR 4682 during much of this time so pointing is not stable.

Target on sun: AR 4682  
WL camera on time: 217/04:12:12  
WL camera off time: 217/04:25:18  
Elapsed time (sec): 786  
Repetition time: 2 sec  
Total number of frames: 394  
Exposure factor: 6  
Limb guider status: Off  
Comments: Exposure factor changed to 8 just after 04:25:18

Target on sun: AR 4682  
WL camera on time: 217/04:25:20  
WL camera off time: 217/04:38:08  
Elapsed time (sec): 768  
Repetition time: 2 sec  
Total number of frames: 385  
Exposure factor: 8  
Limb guider status: Off  
Comments: The IPS loses optical hold and moves off the sun around 04:36:44, which is very close to sunset. The frame at that time is blurry and the spots have moved. All frames after 04:36:44 look blank.

REV 101:

Single pointing was used, at quiet sun on the disk. The exposure time was changed from 6 to 4, and then back to 6 just before sunset.

Target on sun: Granulation (quiet sun on disk)  
WL camera on time: 217/05:17:56 (5 min after sunrise)  
WL camera off time: 217/05:56:02  
Elapsed time (sec): 2286  
Repetition time: 2 sec  
Total number of frames: 1144  
Exposure factor: 6  
Limb guider status: Off  
Comments: Exposure factor changed to 4 at 05:56:04

Target on sun: Granulation (quiet sun on disk)  
WL camera on time: 217/05:56:04  
WL camera off time: 217/06:06:38  
Elapsed time (sec): 634  
Repetition time: 2 sec  
Total number of frames: 318  
Exposure factor: 4  
Limb guider status: Off  
Comments: Exposure factor changed back to 6 at 217/06:06:38

Target on sun: Granulation (quiet sun on disk)  
WL camera on time: 217/06:06:40  
WL camera off time: 217/06:06:50  
Elapsed time (sec): 10  
Repetition time: 2 sec  
Total number of frames: 6  
Exposure factor: 6  
Limb guider status: Off  
Comments: Exposure factor changed back to 6 at 217/06:06:38

REV 102:

For the first two minutes SOUP was pointed at the disk. SOUP was then moved to the limb, with the WL film field covering about 1/4 of the sun and 4/5 blank sky. About 3 min later the pointing was adjusted so that the WL film field included about 2/3 sun and 1/3 blank sky. Then it appears that the pointing was changed to the disk, the exposure factor was changed to 10, and the camera was left running until about 4 minutes after sunset.

Target on sun: Quiet sun (on disk)  
WL camera on time: 217/06:48:07  
WL camera off time: 217/06:50:07  
Elapsed time (sec): 120  
Repetition time: 2 sec  
Total number of frames: 61  
Exposure factor: 8  
Limb guider status: Off  
Comments: Some of these frames are blurry due to motions.

Target on sun: Solar limb  
WL camera on time: 217/06:50:09  
WL camera off time: 217/07:26:55  
Elapsed time (sec): 2206  
Repetition time: 2 sec  
Total number of frames: 1104  
Exposure factor: 8  
Limb guider status: Off  
Comments: Frames from 06:50:09 to 06:50:31 are blurry due to pointing move to limb. Pointing was 1/4 sun, 4/5 sky. Pointing was then adjusted from 06:52:41 to 06:53:17: result was 2/3 sun and 1/3 sky in field.

Target on sun: Solar disk (perhaps near AR 4682)?  
WL camera on time: 217/07:27:15  
WL camera off time: 217/07:41:29 (6 min after sunset)  
Elapsed time (sec): 854  
Repetition time: 2 sec  
Total number of frames: 428  
Exposure factor: 10  
Limb guider status: Off  
Comments: At exp=10 the film often advances twice. Much of this film is blurred. Sunset was at 07:38. From 07:37:25 to 07:38:27 the film annotation was unreadable due to blurring. The main spot of AR 4682 was visible then. Between 102 and 104 there are 3 blank frames.

REV 103:

No film exposures were taken on this rev. The guider was first turned on (it worked very well). Only CID filtergrams were taken (the CID data was not good).

#### REV 104:

SOUP pointed at quiet sun on the disk, well inside the limb. The guider was on and probably worked well. The autofocus program for the filtergraph was run and then manual focus was performed. Laser alignments were run and  $\lambda$ -scans were run in 6302 Å and 5576 Å. The autofocus program in H- $\alpha$  was not successful. Only 3 frames were taken in WL.

Target on sun: Quiet sun (on disk)  
WL camera frame 1: 217/10:08:10  
WL camera frame 2: 217/10:11:36  
WL camera frame 3: 217/10:17:33  
Elapsed time (sec): 563  
Repetition time: none  
Total number of frames: 3  
Exposure factor: 4  
Limb guider status: On (probably working well)  
Comments: Images appear too faint on positive copy to be usable. Between 104 and 105 are about 20 blank frames.

#### REV 105:

SOUP was first pointed at the limb, then quiet sun on the disk. The guider was on but did not work well on the limb. The WL system was focused on the limb, then seq 114 (FO 1.4, short term evolution) was run on the disk with 14 WL frames taken.

Target on sun: Quiet sun (on disk)  
WL camera on time: 217/11:59:24  
WL camera off time: 217/12:10:05  
Elapsed time (sec): 641 sec  
Repetition time: 47 sec, then 53 sec (alternates)  
Total number of frames: 14  
Exposure factor: 6  
Limb guider status: On (working well)  
Comments: Seq 114 running on filtergraph. Images appear too dark to be usable. Three blank frames occur between 105 and 106.

#### REV 106:

SOUP was pointed at quiet sun on the disk, not too close to the limb. The guider was on and probably OK. Seq 114 was run on the filtergraph for about 35 minutes, and 49 WL frames were recorded.

Target on sun: Quiet sun (on disk)  
WL camera on time: 217/13:05:04  
WL camera off time: 217/13:40:56  
Elapsed time (sec): 1552 sec  
Repetition time: 47 sec, then 53 sec (alternates)  
Total number of frames: 49  
Exposure factor: 6  
Limb guider status: On (probably working well)  
Comments: Seq 114 running on filtergraph. There are 4 blank frames between 106 and 107.

**REV 107:**

SOUP was pointed at all 4 limbs in the following order: down, horizontal, right, and then vertical. The guider was off. Seq 116 (FO 4.5) was run in H- $\alpha$  on right limb. At the beginning there are 4 limb frames, then a large number of blank frames, then 13 frames containing density step wedges, and finally a regular sequence of images.

Target on sun: Quiet limb  
WL camera on time: 217/14:59:38  
WL camera off time: 217/15:11:33  
Elapsed time (sec): 715  
Repetition time: 13.5 sec  
Total number of frames: 53?  
Exposure factor: 8  
Limb guider status: Off  
Comments: This was preceeded by 4 limb frames (14:51:41, 14:51:54, 14:52:07, 14:52:20), then about 60 blank frames, then 49 overexposed frames, then 13 frames with step wedges just before 14:59:38. Seq 116 running on filtergraph. Film density is decent. Three blank frames occur, 107 to 108.

**REV 108:**

SOUP was pointed at AR 4682, with the dominant spot centered in the VP field of view. The guider was on and looking great. WL film exposure was changed from 5 to 7 during the orbit.

Target on sun: AR 4682  
WL camera on time: 217/16:16:09  
WL camera off time: 217/16:30:27  
Elapsed time (sec): 858  
Repetition time: 2 sec  
Total number of frames: 430  
Exposure factor: 5  
Limb guider status: On (working very well)  
Comments: Change to Exp=7 at 16:30:25. On this copy the image looks too underexposed to be useful.

Target on sun: AR 4682  
WL camera on time: 217/16:33:18  
WL camera off time: 217/16:42:02  
Elapsed time (sec): 524  
Repetition time: 2 sec  
Total number of frames: 262  
Exposure factor: 7  
Limb guider status: On (working very well)  
Comments: Filtergraph was off. Five blank frames occur  
between 108 and 109.

#### REV 109:

SOUP was pointed at AR 4682, same as rev 108. guider was on and working very well. Filtergraph  $\lambda$ -scans were run on H- $\alpha$ , (came out fair), 6302 Å (came out good), and 5576 Å (scan was no good). The data consists of a sequence of 4 frames, then a 2 minute gap, then another sequence of 17 frames.

Target on sun: AR 4682  
WL camera on time: 217/18:03:08  
WL camera off time: 217/18:13:46  
Elapsed time (sec): 636  
Repetition time: 40 sec  
Total number of frames: 17  
Exposure factor: 7  
Limb guider status: On (working well)  
Comments: Filtergraph ran seq 25 until sunset. Four frames  
occur at the start (17:47:27, 17:48:58, 17:54:26,  
18:01:26), at strange time intervals. Fifteen  
blank frames occur between 109 and 110.

#### REV 110:

SOUP was pointed at AR 4682, with the VP field centered between the sunspot and the pores. The guider was on and working very well. The WL system was focused manually, than updated once from 19:38:07 to 19:40:40.

Target on sun: AR 4682  
WL camera on time: 217/19:10:35  
WL camera off time: 217/19:38:07  
Elapsed time (sec): 1652  
Repetition time: 2 sec  
Total number of frames: 827  
Exposure factor: 7  
Limb guider status: On (working well)  
Comments: Observations were interrupted at 19:38:07 until  
19:40:40 for focus adjustment.

Target on sun: AR 4682  
WL camera on time: 217/19:40:40  
WL camera off time: 217/19:43:30  
Elapsed time (sec): 150  
Repetition time: 2 sec  
Total number of frames: 72  
Exposure factor: 7  
Limb guider status: On (working well)  
Comments: Four frames lost (between 19:41:04 and 19:41:14)  
due to film splice. Both frames at 19:41:04 and  
19:41:14 show some damage. Slight change in back-  
ground occurs across the splice.

**REV 111:**

The white light film was used up part way into this orbit. An exposure test precedes the data. It consists of 19 frames with the following exposure factors: 1, 2, 2, 3, 3, 4, 4, 5, 5, 6, 6, 8, 8, no annotation, 10, 10, 12, no annotation, and 12. SOUP was pointed at AR 4682, the same as rev 110. The guider was on and working very well.

Target on sun: AR 4682  
WL camera on time: 217/21:01:59  
WL camera off time: 217/21:08:24  
Elapsed time (sec): 444  
Repetition time: 2 sec  
Total number of frames: 223  
Exposure factor: 7  
Limb guider status: On (working well)  
Comments: The film ran out after 21:08:24, and there is  
no more WL film data after this time. The frame  
at 21:08:24 is damaged. The exposure test occurs  
before the data, between 20:50:45 and 20:56:06.

SOUP INFLIGHT ANOMALIES  
T. D. Tarbell, O/9130, B/256 Last rev. 3-8-86

Three Major Problems: loss of science data resulted

Power Loss and Reappearance  
Overheating of Focal Plane Package (FPP)  
Severe Blemishes in Tunable Filter (TF) CID Camera Images

Power Loss and Reappearance

The Instrument Pointing System (IPS)-mounted package (telescope & FPP) lost all power after 4.5 hours of nominal on-orbit operation. Telemetry shows no anomalies before sudden, complete power loss. All power-on commands (several different procedures were tried) failed until day 6 of the mission. A nominal command then restored power and the power-on relay was "clamped" on for the next 36 hours. Power was lost again suddenly when the power-on relay was "unclamped" in preparation for landing. Further attempts to restore power on-orbit were unsuccessful. Power came on normally at KSC after landing.

Overheating of Focal Plane Package

FPP operated up to 42 °C during solar observing, 7 °C above the upper limit of the design range; some components ran at 10-12 °C above desired operating temperature. The electronics box on the cruciform ran up to 70 °C, which was the design upper limit.

Blemishes in TF CID Camera Images

Causes of CID imaging problems were:

- a) bubbles in TF oil
- b) contamination on TF CID
- c) contamination on FPP mirror
- d) central brightening in TF CID images
- e) vignetting along edges of TF CID
- f) diagonal line of dark pixels in TF CID
- g) increased noise in TF CID

DUMP OF TAPE JBOUT1

INPLT TAPE JECLT1 CN FT:  
DATA INPUT H9 NF=2 SR=2=1=1

D-79173  
85-063A-08A

FILE	INPUT RECS.	DATA INPLT	RECORDS	MAX. SIZE	READ ERROR SUMMARY				INPUT RETRIES	
					PERM	ZERC	B	SHORT	UNDEF.	#RECS. TOTAL#
( 0 )	FB0A660B	7E0B720B	CD0A480A	880A520B	5B0B8B0A	140AE009	470A5D0B	480C550C	F40B1A0B	780A170A
( 40 )	7E0B8009	630A0F0B	0D0C3A0A	9A0C940A	CF0A410A	3C0A7C0A	2F0B040C	470C2A0C	9B0B1E0B	470B870B
( 80 )	780FE60A	D509FF0B	0D095009	2D0A310A	9C0C9C09	340E9409	480C920A	F00A580A	A8093809	DB0C8709
( 120 )	7109E809	260AD109	1C0A040B	790B600B	F40AEF09	3F09F20B	C108C20B	EA08F40B	D2086E0B	0D08F907
( 160 )	420EC308	FE0CE008	EC08E208	340EC908	D20EC408	08081608	CD07C108	1CC80F08	8C087509	9F0A0D0B
( 200 )	960A7A09	55086E07	D906A206	A406CC06	73079B07	5E077C07	5006CF09	B10A8C09	CA082408	ED07CC07
( 240 )	71073707	93079F08	8609E809	8F09B908	F5087C09	5209720B	DF070A08	0A08F907	E3078307	4307D007
( 280 )	870E1409	81087C07	3F071807	1C071D07	0507FB06	0C07F906	DE069006	3F06F705	4A06F106	AA075508
( 320 )	4A09150A	D8095A09	E709540A	6E0A7C0A	050A7C0A	830DED0C	E90CFF0C	450C390E	3E0FED0E	140E5C0E
( 360 )	9A0DAF0B	A70AB80A	B50B410D	0D0EAF0D	7D0D9F0D	BD0CBA0B	EC0A9C0A	440AE709	4E09C80B	A108940B
( 400 )	ACC8C208	260C640A	CF0B880C	1D0C540B	260BA20B	4D0DF60D	710D360D	740CC30B	6A0B670A	3E09AF08
( 440 )	ACC8E808	4309230A	DE0A540B	5E0E340B	410E620A	F20EB707	BB06E205	7F055605	9E05A705	D3054F06
( 480 )	A70E2107	9D071E08	EE077C07	3A070107	13077A07	4407E407	E407E407	E407E407	F80A660B	7E0B720B
( 520 )	CD0A480A	880A520B	5B0B8B0A	140AE009	470A5D0B	480C550C	F40B1A0B	780A170A	75098009	630A0F0B
( 560 )	CD0C3A0A	980C940A	CF0A410A	3C0A7C0A	2F0B040C	470C2A0C	9B0B1E0B	470B870B	780B860A	D509FF08
( 600 )	0C099F09	2D0A310A	9C0C9C09	340E9409	480C920A	F00A580A	A8093809	DB0C8709	7109E809	260AD109
( 640 )	1C0A040B	790B600B	F40AEF09	3F09F20B	C108C20B	EA08F40B	D2086E0B	0D08F907	4208C30B	FE08DE08
( 680 )	ACC8E208	3408C908	D208C408	08081608	CD07C108	1CC80F08	8C087509	9F0A0D0B	960A7A09	55086E07
( 720 )	D509FA09	A406CC06	73079B07	5E077C07	5006CF09	B10A8C09	CA082408	ED07CC07	71073707	93079F08
( 760 )	8609E809	8F09B908	F5087C09	5209720B	DF070A08	0A08F907	E3078307	4307D007	870E1409	81087C07
( 800 )	3F071807	1D071D07	0507FB06	0C07F906	DE069006	3F06F705	4A06F106	AA075508	4A09150A	D8095A09
( 840 )	B709E40A	650A7C0A	D50A520B	630CED0C	E90CFF0C	450C390E	3E0FED0E	140E5C0E	9A0DAF0B	A70AB80A
( 880 )	B50B410D	0D0EAF0D	7D0D9F0D	BD0CBA0B	EC0A9C0A	440AE709	4E09C80B	A108940B	AC08C208	260C640A
( 920 )	CF0B880C	1D0C540B	260BA20B	4D0DF60D	710D360D	740CC30B	6A0B670A	3E09AF08	AC08E80B	4309230A
( 960 )	DE0A540B	5E0E340B	410E620A	F20EB707	BB06E205	7F055605	9B05A705	D3054F06	A7062107	9D071E08
( 1000 )	EE077C07	3A070107	13077A07	E407E407	E407E407	F80A660B	7E0B720B	CD0A480A	880A520B	
( 1040 )	5B0B8B0A	140AE009	470A5D0B	480C550C	F40B1A0B	780A170A	75098009	630A0F0B	CD0B3A0A	98094B0A
( 1080 )	CF0A410A	3C0A7C0A	2F0B040C	470C2A0C	9B0B1E0B	470B870B	780B860A	D509FF08	0D099009	2D0A310A
( 1120 )	9C0C9C09	340E9409	480C920A	F00A580A	A8093809	DB0C8709	7109E809	260AD109	1C0A040B	790B600B
( 1160 )	F40AEF09	3F09F20B	C108C20B	EA08F40B	D2086E0B	0D08F907	4208C30B	FE08DE08	E008E208	3408C908
( 1200 )	D208C408	08081608	CD070108	1CC80F08	8C087509	9F0A0D0B	960A7A09	55086E07	D906A206	A406CC06
( 1240 )	73079B07	5E077C07	5006CF09	B10A8C09	CA082408	ED07CC07	71073707	93079F08	8609E809	8F09B908
( 1280 )	F5087C09	5209720B	CF070A08	0A08F907	E3078307	4307D007	870E1409	81087C07	3F071807	1C071D07
( 1320 )	0507FB06	0C07F906	DE069006	3F06F705	4A06F106	AA075508	4A09150A	D8095A09	B709540A	650A7C0A
( 1360 )	D50A520B	630CED0C	E90CFF0C	450C390E	3E0FED0E	140E5C0E	9A0DAF0B	A70AB80A	B50B410D	0D0EAF0D
( 1400 )	7D0D9F0D	BD0CBA0B	EC0A9C0A	440AE709	4E09C80B	A108940B	AC08C208	260C640A	CF0B880C	1D0C540B
( 1440 )	260BA20B	4D0DF60D	710D360D	740CC30B	6A0B670A	3E09AF08	AC08E80B	4309230A	DE0A540B	5E0E340B
( 1480 )	410E620A	F20EB707	BB06E205	7F055605	9B05A705	D3054F06	A7062107	9D071E08	EE077C07	3A070107
( 1520 )	13077A07	E407E407	E407E407	E407E407	F80A660B	7E0B720B	CD0A480A	880A520B	5E0E340B	140E5C0E
( 1560 )	470A5D0B	480C550C	F40B1A0B	780A170A	75098009	630A0F0B	CD0B3A0A	98094B0A	CF0A410A	3C0A7C0A
( 1600 )	2F0B040C	470C2A0C	9B0B1E0B	470B870B	780B860A	D509FF08	0D099009	2D0A310A	9C0C9C09	340E9409
( 1640 )	480C920A	F00A580A	A8093809	DB0C8709	7109E809	260AD109	1C0A040B	790B600B	F40AEF09	3F09F20B
( 1680 )	C108C20B	EA08F40B	D2086E0B	0D08F907	4208C30B	FE08DE08	E008E208	3408C908	D208C408	08081608
( 1720 )	CD070108	1CC80F08	8C087509	9F0A0D0B	960A7A09	55086E07	D906A206	A406CC06	73079B07	5E077C07
( 1760 )	5006CF09	B10A8C09	CA082408	ED07CC07	71073707	93079F08	8609E809	8F09B908	F5087C09	5209720B
( 1800 )	DF070A08	0A08F907	E3078307	4307D007	870E1409	81087C07	3F071807	1C071D07	0507FB06	0C07F906
( 1840 )	DE069006	3F06F705	4A06F106	AA075508	4A09150A	D8095A09	B709540A	650A7C0A	D50A520B	630CED0C
( 1880 )	E90CFF0C	450C390E	3E0FED0E	140E5C0E	9A0DAF0B	A70AB80A	B50B410D	0D0EAF0D	7D0D9F0D	BD0CBA0B
( 1920 )	EC0A9C0A	440AE709	4E09C80B	A108940B	AC08C208	260C640A	CF0B880C	1D0C540B	260BA20B	4D0DF60D
( 1960 )	710D360D	740CC30B	6A0B670A	3E09AF08	AC08E80B	4309230A	DE0A540B	5E0E340B	410E620A	F20EB707
( 2000 )	BB06E205	7F055605	9B05A705	D3054F06	A7062107	9D071E08	EE077C07	3A070107	13077A07	E407E407
( 2040 )	E407E407	E407E407								

DUMP OF TAPE JBOUT2

INFLT TAPE JBOUT2 CN FTO  
DATA INFLT FS NF 2 SR 2 1 1

D-79174

85-063A-08A

FILE	INPUT RECS.	DATA RECORDS INPUT	MAX. SIZE	READ ERROR SUMMARY					INPUT RETRIES	
				PERM	ZERO	B	SHCRT	UNDEF.	#RECS.	TOTAL#
1	2	3	4	5	6	7	8	9	10	11
FILE	RECCRC	LENGTH	BYTES							
( )	9009E D	2B00B00C	400CF90B	290C980C	830CC20B	290C2C0C	DB0C020D	7B0CC30B	A60E970C	700CF80C
( 4 )	EE0C8D0C	580C690C	FA0CAA0C	170D1C0D	CB0DD80D	920D120E	B30DC80C	330D7F0D	A80D960D	300D890D
( 6 )	6F0E9D0C	2A0C660C	C70DD00C	2D0CE630E	420E150E	470E430E	EE0E000F	CAGE340E	AD0E740E	220ECF0E
( 120 )	650ED70E	A70E960E	E70ED60E	D10F310E	E90DD40D	0C0EAE0D	FB0DE20D	FC0D250E	930DD60D	5C0E810F
( 160 )	AB0E200F	570E400F	D10E0E0E	DA0E2D0E	190CED0E	4E0FB50F	E30E310F	C60FEE0E	14100810	8A0E6F0E
( 200 )	200EC20C	D20CF80C	5C0E7B0C	E80CCD20D	E60CE60C	9C0C130D	8C0DF30C	CA0CC00B	CC0CC00C	B90CB90B
( 240 )	5C0C7F0C	5C0C7A0C	5A0C330D	500D250D	CF0CED0C	9F0DF40E	140DD60D	E40C7E0C	C50D9E0C	E10C660C
( 280 )	7E0CC00E	8E0CC70C	590CF40B	E70CE830B	800CE930B	080EEA0B	CF0BE8CC	8B0B390C	E20B060C	200CD30B
( 320 )	2A0E030A	7A0A130B	A90A860A	E20CA020A	CA0AC00B	640A4F0B	7C0EA30B	C70A890A	CF0A270A	310AAE0A
( 360 )	6F0AFA09	230A870A	B90AEF0B	CA0BED0B	970C9C0B	E90A9E0A	830A910A	BC0AAD0A	E50AC10A	0A0BEA0A
( 400 )	4C0B400B	FF0AD00A	820BA60B	620CA00C	7B0C9F0C	040C6C0C	D60CA90C	E00C880B	CE0BB50B	5E0B6D0B
( 440 )	5E0E200E	580A660A	E30A060A	7A0CD50A	D10CA330B	120A060A	7B0A700A	4C0A330A	570AE20A	FF0AD00A
( 480 )	200CA30A	A40A000B	030A330A	1B0A1F0A	300EBC0B	8C0A800A	8D0A800A	8D0A800A	9C0D5E0C	2E0CDB0C
( 520 )	400CF90B	290C980C	830CC20B	290C2C0C	DB0CD20D	7B0CC30B	A60B970C	700DF80C	FE0C8D0C	580C690C
( 560 )	FACCAA0C	170C1C0D	CB0DD80D	920D120E	E30CC80C	330D7F0D	A80D960D	300D890D	6F0D9D0D	2A0D650D
( 600 )	C70ED00E	2D0E630E	420E150E	470E430E	EE0E000F	CAGE340E	AD0E740E	220ECF0E	650EC70E	A70E960E
( 640 )	E70ED60E	D10F310E	E90DD40D	0C0EAE0D	FB0DE20D	FC0D250E	930DD60D	5C0E810F	AB0E200F	970E400F
( 680 )	D10E0E0E	DA0E2D0E	190CED0E	4E0FB50F	E30E310F	060FEE0E	14100810	8A0E6F0E	2C0EC20D	D20DF80D
( 720 )	500E7B0C	B80DD00D	E60CE60C	9C0C130D	8C0DF30C	0A0CC00B	CC0CC00C	B90CB90B	5C0C7F0C	5C0C7A0C
( 760 )	5A0C330D	500D250D	CF0CED0C	9F0DF40E	140DD60D	540C7E0C	050D9E0C	E10C660C	7E0CDB0C	8F0CC70C
( 800 )	590CF40B	E70CE830B	800CE930B	080EEA0B	DF0B8C0C	8B0B390C	E20B060C	200CD30B	2A0BC30A	7A0A130B
( 840 )	AS0AE60A	620CA00C	CA0AC00B	640A4F0B	7C0EA30B	D70A890A	CF0A270A	310AAE0A	6F0AFA09	230A870A
( 880 )	B90AEF0B	CA0BED0B	970C9C0B	E90A9E0A	830A910A	8C0A800A	8D0A800A	8D0A800A	9C0D5E0C	2E0CDB0C
( 920 )	820BA60B	620CA00C	7B0C9F0C	040C6C0C	D60CA90C	E00C880B	CE0BB50B	5E0B6D0B	5B0B0C0B	980A660A
( 960 )	E30A060A	7A0CD50A	D10CA330B	120A060A	7E0A700A	4C0A330A	570AE20A	FF0AD00A	200CA30A	A40A000B
( 1000 )	200CA30A	1B0A1F0A	300EBC0B	8C0A800A	8D0A800A	8D0A800A	9C0D5E0C	2E0CDB0C	4C0CF50E	250C980C
( 1040 )	830CC20B	290C2C0C	DB0CD20D	7B0CC30B	A60B970C	700DF80C	FE0C8D0C	580C690C	FA0CAA0C	170D1C0D
( 1080 )	CB0DD80D	920D120E	B30DC80C	330D7F0D	A80D960D	300D890D	6F0D9D0D	2A0D650D	C70DD00E	2D0E630E
( 1120 )	420E150E	470E430E	EE0E000F	CAGE340E	AD0E740E	220ECF0E	650EC70E	A70E960E	E70ED60E	D10F310E
( 1160 )	E90DD40D	0C0EAE0D	FB0DE20D	FC0D250E	930DD60D	5C0E810F	AB0E200F	970E400F	D10E0E0E	DA0E2D0E
( 1200 )	190CED0E	4E0FB50F	E30E310F	060FEE0E	14100810	8A0E6F0E	2C0EC20D	D20DF80D	5C0E7E0C	B80CC20D
( 1240 )	860D660C	9C0C130D	8C0DF30C	0A0CC00B	CC0CC00C	B90CB90B	5C0C7F0C	5C0C7A0C	5A0C330D	500D250D
( 1280 )	CF0CED0C	9F0DF40E	140DD60D	E40C7E0C	050D9E0C	E10C660C	7E0CDB0C	8E0CC70C	590CF40B	670B830B
( 1320 )	800CE930B	080EEA0B	DF0B8C0C	8B0B390C	E20B060C	200CD30B	2A0BC30A	7A0A130B	AS0AE60A	620CA00C
( 1360 )	1A0A000B	640A4F0B	7C0EA30B	C70A890A	CF0A270A	310AAE0A	6F0AFA09	230A870A	B90AEF0B	CA0BED0B
( 1400 )	070C9C0B	E90A9E0A	830A910A	8C0A800A	8D0A800A	8D0A800A	9C0D5E0C	2E0CDB0C	820BA60B	620CA00C
( 1440 )	7E0CCE0C	040C6C0C	D60CA90C	E00C880B	CE0BB50B	5E0B6D0B	5B0B0C0B	980A660A	E30A060A	7A0CD50A
( 1480 )	D10CA330B	120A060A	7E0A700A	4C0A330A	570AE20A	FF0AD00A	200CA30A	A40A000B	C30A330A	1B0A1F0A
( 1520 )	300EBC0B	8C0A800A	8D0A800A	8D0A800A	B10C110D	2C0D810C	560C170C	AB0B060B	030C2B0C	2A0C6C0C
( 1560 )	310C630D	E40C350C	5A0C860C	2C0C170D	160DFE0C	D30C230D	3C0DCC0C	CA0C8C0C	CC0D5A0E	550D8B0D
( 1600 )	240C080C	F50C780C	0C0E0E0C	070C540C	3A0EC20E	900D700C	430E0ACE	CE0DCC0C	AA0CE80E	5E0CFE0D
( 1640 )	A30E630E	E40E720E	A10D040E	540E060E	2C0EC50E	540E5B0E	F60EC10E	BE0EFA0D	570E650E	5E0CFE0D
( 1680 )	090C010E	ED0D3F0E	FF0DD00D	2C0E350F	460D300F	450FEF0E	D10E750F	B30E6B0E	430EA50E	EB0E3C10
( 1720 )	E10E0A0E	CB0E6C0F	9B104F10	E40E8F0E	3E0ED00C	F00C030C	5F0DF00C	FD0CFACD	2C0E4B0D	CD0C2B0D
( 1760 )	0F0D8E0C	290CEB0B	FE0BEA0E	7E0EB50B	340C100C	B10C400C	900CCACC	A20D960D	9C0DE00C	7F0C450E
( 1800 )	FF0B660C	900C2A0C	010CEA0B	FF0CCC0C	9C0BEB0B	5F0D490C	440C130C	AF0B8B0B	940BAE0B	3F0B9D0B
( 1840 )	520E2B0C	100C730C	350CAB0E	070E610B	C10E1D0B	140E190E	1B0E3E0B	C50A9E0A	480A360A	750AF20A
( 1880 )	2F0B440B	AE0A720A	600AD909	DE09630A	210A2A0A	810A5F0A	CD0AGA0B	450E5F0A	8E0E8E0E	ED0CAE0A
( 1920 )	FE0AE20A	910AA80A	720A500A	510E3D0B	CC0EAD0A	BC0ACD0A	7F0B8E0E	CF0E1F0C	E90BC60E	FE0CE00B
( 1960 )	580CCE0C	D90C540B	DE0B870A	CAFAB80A	2E0EAE0B	F50A410A	BAGAS00A	8F0A030A	4C0A520A	930AAACA
( 2000 )	000FB00A	AEDAFE09	550A590A	C40AED0B	5B0B760B	C00A010B	9E0A880A	E5093B0A	460AB60A	4D0A4D0A
( 2040 )	4C0A4C0A	4D0A4D0A								