

JSC-09652

APOLLO LUNAR SURFACE EXPERIMENT PACKAGE
ARCHIVE TAPE DESCRIPTION DOCUMENT

Job Order 83-147

Prepared By

Lockheed Electronics Company, Inc.
Aerospace Systems Division
Houston, Texas

Contract NAS 9-12200

For

INSTITUTIONAL DATA SYSTEMS DIVISION



National Aeronautics and Space Administration
LYNDON B. JOHNSON SPACE CENTER
Houston, Texas

May 1975

LEC-5002

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HOUSTON, TEXAS

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TECHNICAL REPORT INDEX/ABSTRACT
(See instructions on reverse side.)

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13. ABSTRACT The document provides the information needed by programmers to develop the software for retrieving digital experiment data from the 24-hour time-edit save tapes for any of the five Apollo Lunar Surface Experiment Packages (ALSEP's). These data are contained on digital tapes archived at the National Records Center, Suitland, Maryland.		
14. SUBJECT TERMS		
<u>ALSEP</u>	<u>Surface</u>	<u>Archive</u>
<u>Apollo</u>	<u>Experiment</u>	<u>Digital</u>
<u>Lunar</u>	<u>Package</u>	<u>Tape</u>

FOREWORD

The *Apollo Lunar Surface Experiment Package Archive Tape Description Document* is intended for use in conjunction with the *Apollo Scientific Experiments Handbook*, NASA TM X-58131 dated August 1974. These documents will aid Principal Investigators (PI's), other than those originally assigned, in their retrieval of experiment data from archived digital ALSEP tapes. The *Apollo Scientific Experiments Data Handbook* presents a brief description of each of the Apollo scientific experiments together with the operational history, the data contents and formats, and the availability of digitally processed tapes provided by the PI's. The *Apollo Lunar Surface Experiment Package Archive Tape Description Document* provides the information needed to develop software for retrieving digital experiment data from any of the five Apollo Lunar Surface Experiment Package (ALSEP) 24-hour, time-edited save tapes. These tapes are generated at JSC and subsequently archived at the National Records Center, Suitland, Maryland.

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ACRONYMS AND ABBREVIATIONS

ALSEP	Apollo Lunar Surface Experiment Package
ARCSAV	Archived ALSEP 24-hour time-edited save tape
ASE	Active Seismic Experiment
BCD	Binary coded decimal
CCGE	Cold Cathod Gage Experiment
CPLEE	Charged Particle Lunar Environment Experiment
DTREM	Dust, Thermal, and Radiation Engineering Measurement Package
GSFC	Goddard Space Flight Center
HFE	Heat Flow Experiment
kbps	Kilobits per second
LEAM	Lunar Ejecta and Meteorites
LDDE	Lunar Dust Detector Experiment
LMS	Lunar Mass Spectrometer
LSB	Least significant bit
LSG	Lunar Surface Gravimeter
LSM	Lunar Surface Magnetometer
MSB	Most significant bit
NRC	National Records Center
OD	Other data
PI	Principal Investigator
PSE	Passive Seismic Experiment
SIDE	Suprathermal Ion Detector Experiment
SWS	Solar Wind Spectrometer

1.0 INTRODUCTION

1.1 Purpose

The purpose of this document is to provide the information needed by programmers which would permit development of software to be used for retrieving digital experiment data from any of the five Apollo Lunar Surface Experiment Packages (ALSEP's) 24-hour time-edited save tapes. These data are contained on digital tapes archived at the National Records Center (NRC), Suitland, Maryland.

1.2 Scope

In order to accomplish the intended purpose, this document provides the following:

- A description of the structure and contents of the archived ALSEP 24-hour time-edited save tapes (ARCSAV).
- Information, unique to each ALSEP, necessary for the development of retrieval logic.
- Descriptions of the tape's quality status and validation procedures employed prior to archiving.

2.0 ARCSAV TAPES

2.1 ARCSAV Tape Description

The ARCSAV tape is a binary, seven-track, digital tape written at 800 bits-per-inch on the Control Data Corporation (CDC) 3200 computer with a standard end-of-file. The tape contains 24 hours of data for one ALSEP, with a maximum of 1,061 physical records. One physical record is composed of three logical records. One logical record contains 2 header words, 45 words of time, 720 words of data (45 ALSEP frames), and 33 filler words for a total of 800 48-bit words. A frame represents 603.773 milliseconds of data.

2.2 Logical Record

Each logical record contains 800 48-bit words as shown in figure 1. All words are written in binary except word zero, which is written in binary coded decimal (BCD). The year is located in word zero, bits 0 through 23. The day is contained in word zero, bits 24 through 47. Word one contains the remote tracking station site code, the Apollo flight number, and the record number, located in bits 0 through 11, 12 through 23, and 24 through 35, respectively. Bits 36 to 47 of word one are zero-filled.

Along with the edited and unedited time and data sync status flags, time is located in words 2 through 46. Time is represented in milliseconds in a fixed point format. Each of these 45 words is identified as follows: time is found in bits 0 through 35, the unedited data sync status is in bits 36 through 38, the unedited time sync status is in bits 39

through 41, the edited data sync status is in bits 42 through 44, and bits 45 through 47 contain the edited time sync status.

Data is found in words 47 through 766. Each data word is divided into four, 12-bit bytes. Each 12-bit byte contains one ALSEP word. The two least significant bits of each byte are used for zero-fill, and the remaining 10 bits are data. For example in figure 1, the first, 12-bit byte of word 47, bits 0 through 11, represent the ALSEP word 04, where bits 0 and 1 are zero-fill and bits 2 through 11 are data. Words 767 through 799 are zero-filled.

2.3 Time-Sync Status Flags

The edited time-sync status words on the ARCSAV tape and their meanings are as follows:

<u>Time-Sync Word</u>	<u>Description</u>
0	Fill data, used when last record has less than 45 frames.
1	Wild time.
3	Reinitialization of time by the time-edit program.
5	The time in the time slot was built by the time-edit program.
6	When the data was being decommutated, the hardware indicated that the time was bad, but the time-edit program subsequently found the time to be good.

	47		35		23		11		0
	DAYS (BCD)				YEAR (BCD)				
1	RECORD NUMBER (BINARY)				APOLLO FLIGHT NUMBER (BINARY)		SITE CODE (BINARY)		
2	S1(0)	44 S5(0)	41 S1(0)	38 S5(0)	TIME (MILLISECONDS)				(0) (1)

	EDITED SYNC		UNEDITED TIME AND DATA SYNC						

46	S1(44)	S5(44)	S1(44)	S5(44)	TIME (MILLISECONDS)				(44)
47		01(0)		02(0)		03(0)		04(0)	
		06(0)		08(0)		09(0)		10(0)	
		11(0)		12(0)		13(0)		14(0)	
		16(0)		18(0)		20(0)		22(0)	
		24(0)		25(0)		26(0)		27(0)	
		28(0)		29(0)		30(0)		32(0)	
		33(0)		34(0)		35(0)		36(0)	
		37(0)		38(0)		40(0)		41(0)	
		42(0)		43(0)		44(0)		45(0)	
		46(0)		48(0)		50(0)		52(0)	
		54(0)		57(0)		58(0)		59(0)	
		60(0)		61(0)		62(0)		64(0)	
58									
59		01(1)		02(1)		03(1)		04(1)	
		
		
586		60(44)		61(44)		62(44)		64(44)	
587		05(0)		07(0)		15(0)		17(0)	
		19(0)		21(0)		23(0)		31(0)	
		39(0)		47(0)		49(0)		51(0)	
590		53(0)		55(0)		56(0)		63(0)	
591		05(1)		07(1)		15(1)		17(1)	
		
		
766		53(44)		55(44)		56(44)		63(44)	
767		FILL		FILL		FILL		FILL	
799									

PSE OR LSG WORDS

NON-PSE OR LSG WORDS

Figure 1. - Time-edited output format.

<u>Time-Sync Word</u>	<u>Description</u>
7	When the data was being decom- mutated, the hardware indicated the time was good, and the time- edit program subsequently found the time to be good.

2.4 Data-Sync Status Flags

The edited data-sync status words on the ARCSAV tape and their meanings are as follows:

<u>Data-Sync Word</u>	<u>Description</u>
7	Good status.
5	One-bit slip.
4	Questionable quality.
0	Loss of synchronization.

The edited data-sync status word of the frame immediately preceding a loss of synchronization indication is changed to a four because the status of that frame is of questionable quality.

2.5 Data Retrieval Procedures

When developing software to retrieve ALSEP data, the logical steps to be followed when using this document are:

- Identify the experiment from which data is to be retrieved.
- Identify the ALSEP package containing the desired experiment.

- Locate the appendix in this document associated with the required ALSEP. Following is a list of the appendixes.

<u>ALSEP</u>	<u>Apollo Mission Number</u>	<u>Array*</u>	<u>Appendix</u>
1	12	A	A
2	15	A-2	C
3	16	D	D
4	14	C	B
5	17	E	E

- Turn to the Main Frame Parameter Listing page in the appendix containing the required package.
- Locate the ALSEP words associated with the experiment whose data is to be retrieved.
- After determining the ALSEP words for the data to be retrieved, turn back to the ARCSAV format (fig. 1) to find the location of the required parameters.

*The array is the identification notation used by Bendix to distinguish each ALSEP.

3.0 ARCSAV TAPE VALIDITY CHECK

3.1 PCHK24HR Program

The ARCSAV Tape Validity Check Program (PCHK24HR) is a quality check program run on each ARCSAV tape prior to its shipment to the NRC for archiving. PCHK24HR performs the following validity checks:

- Verifies the Apollo mission number.
- Verifies the ALSEP number.
- Identifies the ARCSAV start and stop times in year/days/hours/minutes/seconds.
- Counts the parity records and identifies their location.
- Identifies data gaps greater than 2 hours.

3.2 ARCSAV Tape Summary

An ARCSAV tape summary reflecting the aforementioned checks accompanies each tape sent to the NRC. Figure 2 is an example of an ARCSAV tape summary.

ALSEP 24 HOUR TAPE SUMMARY

TAPE NUMBER V13467

ALSEP 2 (ARRAY A-2)

APOLLO FLIGHT 15

MISSION ID. A/S509

	YEAR	DAY	HR	MN	SS
--	------	-----	----	----	----

TAPE START	1974	291	0	0	0
------------	------	-----	---	---	---

TAPE STOP	1974	291	23	59	59
-----------	------	-----	----	----	----

TOTAL RECORDS 1061 (DATA)

TOTAL PARITIES 0

PARITY RECORDS AT

***** NONE *****

DATA GAPS EXCEEDING 120 MINUTES

***** NONE *****

Figure 2. - ARCSAV tape summary.

4.0 ALSEP START AND STOP TIMES - OLD AND NEW

The start and stop times in hours, minutes, and seconds on all ARCSAV tapes for the packages prior to 2400 hours April 1, 1974 are as follows:

<u>ALSEP</u>	<u>Start Time</u>	<u>Stop Time</u>
1	14:21:21	14:21:20
4	17:44:00	17:43:59
2	18:52:00	18:51:59
3	20:20:00	20:19:59
5	02:53:20	02:53:19

The start and stop times in hours, minutes, and seconds on all packages after 2400 hours April 1, 1974, are 00:00:00 and 23:59:59, respectively. The data processed for the remaining part of the day of March 31, 1974, for each package are on ARCSAV tapes, but the tapes are not 24 hours in length.

5.0 EFFECTIVE DATE OF NATIONAL RECORDS
CENTER ARCSAV TAPES

The ARCSAV tapes archived at the National Records Center (NRC) provide information processed from the effective start dates indicated below. Prior to these dates, the ALSEP data are available only on analog range tapes archived at Goddard Space Flight Center (GSFC).

<u>ALSEP</u>	<u>ALSEP Day</u>	<u>Beginning Date</u>
1	1230	1 April 73
4	787	1 April 73
2	610	1 April 73
3	345	1 April 73
5	111	2 April 73

6.0 ALSEP EXPERIMENTS DESCRIPTIONS

6.1 Passive Seismic Experiment (PSE)

The PSE is designed to monitor lunar seismic activity and at the same time afford the opportunity to detect meteoroid impacts and free oscillations. It also detects surface tilt produced by tidal deformations, which result, in part, from periodic variations in the strength and direction of external gravitational fields acting upon the moon and from changes in the vertical component of gravitational acceleration.

6.2 Active Seismic Experiment (ASE)

The ASE is used primarily to generate and monitor artificial waves in the 3- to 250-Hz range in the lunar surface and near subsurface. The ASE can also be used to monitor natural seismic waves in the same frequency range. Data acquired from the ASE aids in the determination of the physical properties of the lunar surface and near subsurface.

6.3 Solar Wind Spectrometer (SWS)

The SWS measures energies, densities, incidence angles, and temporal variations of the electron and proton components of the solar wind plasma that strikes the surface of the moon. The experiment also yields data on the properties of the tail of the earth's magnetosphere.

6.4 Suprathermal Ion Detector Experiment (SIDE)

The SIDE measures the ionic environment of the moon by detecting the ions resulting from the ultraviolet ionization of the lunar atmosphere and the free-streaming and thermalized solar wind. The suprathermal ion detector measures the flux, number density, velocity, and energy per unit charge of positive ions in the vicinity of the lunar surface.

6.5 Charged Particle Lunar Environment Experiment (CPLEE)

The CPLEE measures the particles in interplanetary space. These particles coming from the sun are measured by number and by energy spectrum. Studies have shown that an interface, known as the magnetopause, exists between the interplanetary magnetic field and the magnetic field of the earth. Whether such a shock front and interface exist around the moon is not known. This experiment measures protons and electrons over the energy ranges to define the particle environment.

6.6 Cold Cathode Gage Experiment (CCGE)

The CCGE determines the density of any lunar ambient atmosphere, including any temporal variations either of a random character or associated with lunar local time or solar activity. Additionally, the CCGE determines the rate of loss of contaminants left in the landing area by the astronauts and the lunar module.

6.7 Dust, Thermal, and Radiation Engineering Measurement (DTREM) Package

The DTREM package measures dust accretion and the long-term effects of the lunar environment on solar cells. It provides information on the lunar radiation environment and the lunar surface brightness temperature.

6.8 Heat Flow Experiment (HFE)

The HFE measures the temperature gradient and the thermal conductivity in the near-surface layers of the moon. The measurements obtained from the experiment enable the average value of the net heat flux as well as its direction to be determined. Knowledge of the lunar heat flux provides additional information concerning (1) a comparison of the radioactive content of the moon's interior and the earth's mantle, (2) a thermal history of the moon, (3) a lunar temperature-versus-depth profile, and (4) the value of thermal parameters in the first, 3 meters of the moon's crust.

6.9 Lunar Surface Magnetometer (LSM) Experiment

The LSM experiment provides data pertaining to the magnetic field at the lunar surface by measuring the magnitude and temporal variations of the lunar-surface equatorial-vector magnetic field. Electromagnetic disturbances originating in the solar wind and subsurface magnetic material near the magnetometer are also detected. This experiment gives some indication of heterogeneities in the lunar interior.

6.10 Lunar Mass Spectrometer (LMS) Experiment

The LMS experiment is designed to identify and determine the density and composition of the lunar atmosphere, including any temporal variations of a random character or those associated with lunar local time or solar activity. In addition, the rate of loss on contaminants left in the landing area by the astronauts and lunar module is measured.

6.11 Lunar Ejecta and Meteorites (LEAM) Experiment

The LEAM experiment is designed to measure the physical parameters of primary cosmic dust encountered on the lunar surface and to detect lunar ejecta or secondary spray particles emanating from the site of meteorite impacts. It is also aimed at determining the radiant flux density and speed of particles in meteor streams and at performing a control experiment on the reliability of the acoustical sensor as a cosmic dust sensor.

6.12 Lunar Surface Gravimeter (LSG)

The LSG is designed to study the lunar gravitational field by measuring the magnitude and the time variation of the vertical component of gravity at a location on the lunar surface. The LSG consists of four basic components: a LaCoste and Romberg mass spring-level system, an electronics package, a thermal control box, and a sun shade. The objective of this experiment is to determine lunar deformation due to tidal forces in order to establish the internal constitution. Also, the existence of gravitation radiation from intense cosmic sources such as neutron stars can be determined.

7.0 EXPERIMENTS ON EACH ALSEP

The following table shows each ALSEP and its experiments:

Experiment	ALSEP Flight Article				
	1 AS-507 Array A Apollo 12	2 AS-510 Array A-2 Apollo 15	3 AS-511 Array D Apollo 16	4 AS-509 Array C Apollo 14	5 AS-512 Array E Apollo 17
PSE	EXP 1	EXP 1	EXP 1	EXP 1	
ASE*			EXP 2	EXP 2	
LSM	EXP 2**	EXP 2**	EXP 3		
SWS	EXP 3	EXP 3**			
SIDE/CCGE	EXP 4	EXP 4		EXP 3	
HFE		EXP 5	EXP 4 [‡]		EXP 3
CPLEE				EXP 4	
DTREM [†]	†	†		†	
LEAM					EXP 2
LSP*					EXP 5
LMS					EXP 1
LSG					EXP 4

*When these experiments are activated, data from the other experiments in the package is not received.

**Data from these experiments does not appear on the ARCSAV tape after June 14, 1974.

[†]Central station (engineering and housekeeping data).

[‡]Never deployed.

8.0 PRINCIPAL INVESTIGATORS

The following is a list of the Principal Investigators (PI's) originally assigned to each experiment. Included is their current address as of the writing of this document.

<u>Experiment</u>	<u>PI</u>
PSE	Dr. Gary Latham University of Texas Medical Branch at Galveston Galveston, TX 77550
SWS	Dr. Doug Clay Jet Propulsion Laboratory 4800 Oak Grove Drive Pasadena, CA 91103
SIDE	Dr. J. W. Freeman Department of Space Science Rice University Houston, TX 77001
CPLEE	Dr. David Reasoner Department of Space Science Rice University Houston, TX 77001
CCG	Dr. J. S. Johnson University of Texas at Dallas P. O. Box 3065 Dallas, TX 75230
LDDE	Mr. Jim Bates Mail Code - TN3 Bldg. 31, Room 243 NASA - Johnson Space Center Houston, TX 77058
HFE	Dr. Marcus Langseth Columbia University Lamont Geological Observatory Palisades, NY 10946

Experiment

PI

LSM	Dr. Palmer Dyal NASA - Ames Research Center Moffett Field, CA 94035
LMS	Dr. John H. Hoffman Atmospheric and Space Sciences University of Texas at Dallas Dallas, TX 75230
LEAM	Mr. Otto E. Berg Mail Code 641 NASA - Goddard Space Flight Center Greenbelt, MD 20771
LSG	Dr. Joseph Weber Department of Physics and Astronomy University of Maryland College Park, MD 20742
LSP/ASE	Dr. Bob Kovach Stanford University Department of Geophysics Palo Alto, CA 94035 Dr. J. S. Watkins University of Texas Medical Branch At Galveston Galveston, TX 77550

APPENDIX A

APOLLO 12 - ALSEP 1

This appendix has been taken from the *Data Acquisition Plan, Annex B-1, ALSEP Telemetry Data Format Control Book*, prepared by Philco-Ford, Houston Operations, July 1972. Modifications to this material were made by Lockheed Electronics Company, Inc.

- 1.1 ALSEP 1, ARRAY A, APOLLO 12
- 1.1.1 Normal/Slow PCM Telemetry Description
- 1.1.1.1. General Description
- 1.1.1.1.1. Downlink Data Rates

APOLLO LUNAR SURFACE EXPERIMENTS PACKAGE (ALSEP) PCM Telemetry is downlinked at either a normal or slow data rate as shown below. The downlinked bit rate is selectable upon Earth command.

Normal Data Rate	Slow Data Rate
. 1060 bits/sec	. 530 bits/sec
. 10 bits/word	. 10 bits/word
. 64 words/frame	. 64 words/frame
. 640 bits/frame	. 640 bits/frame
. 0.943 ms/bit	. 1.887 ms/bit
. 9.43 ms/word	. 18.87 ms/word
. 603.773 ms/frame	. 1.21 sec/frame
. Data are transmitted MSB first (Bit 1).	

The major subsystems included in Flight System One are:

I. Data System (CONT)	5 words
A. Control	
B. Command Verification	
C. Housekeeping	
II. EXP. NO. 1 - Passive Seismic Experiment (PSE)	43 words
*III. EXP. NO. 2 - Lunar Surface Magnetometer (LSM)	7 words
IV. EXP. NO. 3 - Solar Wind Spectrometer Experiment (SWS)	4 words
V. EXP. NO. 4 - Suprathermal Ion Detector Experiment (SIDE)	5 words
	<hr style="width: 10%; margin-left: auto; margin-right: 0;"/>
	64 words total

*LSM data will not appear on any ARCSAV tapes after June 14, 1974.

1.1.1.1.2 ALSEP/MAIN FRAME WORD ASSIGNMENT

1 CONT.	2 CONT.	3 CONT.	4 PSE	5 LSM	6 PSE	7 SWS	8 PSE
9 PSE	10 PSE	11 PSE	12 PSE	13 PSE	14 PSE	15 SIDE	16 PSE
17 LSM	18 PSE	19 LSM	20 PSE	21 LSM	22 PSE	23 SWS	24 PSE
25 PSE	26 PSE	27 PSE	28 PSE	29 PSE	30 PSE	31 SIDE	32 PSE
33 HOUSE-KEEPING	34 PSE	35 PSE	36 PSE	37 PSE	38 PSE	39 SWS	40 PSE
41 PSE	42 PSE	43 PSE	44 PSE	45 PSE	46 COMMAND VERIFI- CATION	47 SIDE	48 PSE
49 LSM	50 PSE	51 LSM	52 PSE	53 LSM	54 PSE	55 SWS	56 SIDE
57 PSE	58 PSE	59 PSE	60 PSE	61 PSE	62 PSE	63 SIDE	64 PSE

Each box contains one 10-bit word.

Total bits per frame--10 x 64 = 640 bits.

1.1.1.1.3. ALSEP MAIN FRAME PARAMETER LISTING

DOWNLINK LISTINGS COLUMN HEADERS

- Col. 1 Experiment name.
- Col. 2 Measurement number. (An asterisk in col. 11 indicates that the word is subcommanded)
- Col. 3 Measurement name.
- Col. 4 ALSEP main frame (1-64) word. An asterisk in this column indicates that experiment's words are asynchronous with respect to the ALSEP main frame word.
- Col. 5 ALSEP frame. The ALSEP frame number as read from the ALSEP frame counter in ALSEP word 3. The ALSEP frame counter counts from 1-89, and then to 0, which represents 90. Columns 46-48 may contain one of the following words:
- ALL = All ALSEP main frames
 - EVN = Even numbered ALSEP main frames
 - ODD = Odd numbered ALSEP main frames.
- An asterisk in this column indicates that this parameter is asynchronous with respect to the ALSEP frame.
- Col. 6 Bits. Indicates which of the ten bits (1-10) of an ALSEP or experiment word contain the measurement number given in columns 7-11.
- Col. 7 Samples per Main Frame (S/MF). Indicates how often (on the average) a parameter appears in the ALSEP main frame.
- Col. 8 Experiment word. For the LSM these columns indicate the LSM word number (1-16)
For the SIDE these columns indicate the SIDE word number (1-10)
For the SWS these columns indicate the SWS word number (0-185)
- Col. 9 Experiment Frame. For the SWS these columns indicate the SWS sequence number (0-15)
For the SIDE these columns indicate the SIDE frame number (0-127)
- Col. 10 Flag bits.

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD	FRM	BITS	S/MF	EXPERIMENT WD	FG FRAME	BT
CONT	DA-1A	SYNC (1110001001)	1	ALL	1-10	1			
CONT	DA-1B	SYNC (0000111011)	2	ALL	1-10	1			
CONT	WD03*	SYNC, CTR, AND ID	3	ALL	1-10	1			
PSE	DL-8	SP SEISMIC Z	4	ALL	1-10	29			
LSM	WD05*	ENGR MEASUREMENTS	5	ALL	1-10	1			
PSE	DL-8	SP SEISMIC Z	6	ALL	1-10	29			
SWS	WD07*	SWS WORDS (0-185)	7	ALL	1-10	4			
PSE	DL-8	SP SEISMIC Z	8	ALL	1-10	29			
PSE	DL-1	LP SEISMIC X	9	ALL	1-10	4			
PSE	DL-8	SP SEISMIC Z	10	ALL	1-10	29			
PSE	DL-2	LP SEISMIC Y	11	ALL	1-10	4			
PSE	DL-8	SP SEISMIC Z	12	ALL	1-10	29			
PSE	DL-3	LP SEISMIC Z	13	ALL	1-10	4			
PSE	DL-8	SP SEISMIC Z	14	ALL	1-10	29			
SIDE	WD15*	SIDE WORD 1 OR 6	15	ALL	1-10	1			
PSE	DL-8	SP SEISMIC Z	16	ALL	1-10	29			
LSM	DM-25	X-AXIS FIELD	17	ALL	1-10	2			
PSE	DL-8	SP SEISMIC Z	18	ALL	1-10	29			
LSM	DM-26	Y-AXIS FIELD	19	ALL	1-10	2			
PSE	DL-8	SP SEISMIC Z	20	ALL	1-10	29			
LSM	DM-27	Z-AXIS FIELD	21	ALL	1-10	2			
PSE	DL-8	SP SEISMIC Z	22	ALL	1-10	29			
SWS	WD23*	SWS WORDS (0-185)	23	ALL	1-10	4			
PSE	DL-8	SP SEISMIC Z	24	ALL	1-10	29			
PSE	DL-1	LP SEISMIC X	25	ALL	1-10	4			
PSE	DL-8	SP SEISMIC Z	26	ALL	1-10	29			
PSE	DL-2	LP SEISMIC Y	27	ALL	1-10	4			
PSE	DL-8	SP SEISMIC Z	28	ALL	1-10	29			
PSE	DL-3	LP SEISMIC Z	29	ALL	1-10	4			
PSE	DL-8	SP SEISMIC Z	30	ALL	1-10	29			
SIDE	WD31*	SIDE WORD 2 OR 7	31	ALL	1-10	1			
PSE	DL-8	SP SEISMIC Z	32	ALL	1-10	29			
CONT	WD33*	HOUSEKEEPING	33	ALL	1-10	1			
PSE	DL-8	SP SEISMIC Z	34	ALL	1-10	29			
PSE	WD35*	TIDAL X OR Z	35	ALL	1-10	1			

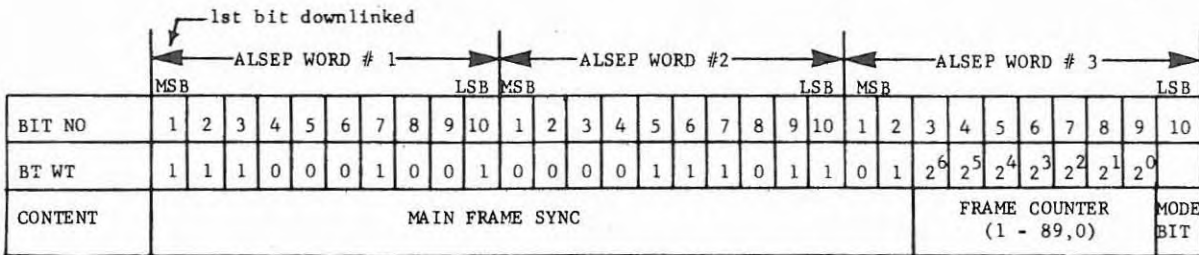
EXP NAME	MEAS NO	MEAS NAME	ALSEP			EXPERIMENT		
			WD	FRM	BITS	S/MF	WD	FRAME
PSE	DL-8	SP SEISMIC Z	36	ALL	1-10	29		
PSE	WD37*	TIDAL Y OR SENSOR UNIT TEMP	37	ALL	1-10	1		
PSE	DL-8	SP SEISMIC Z	38	ALL	1-10	29		
SWS	WD39*	SWS WORDS (0-185)	39	ALL	1-10	4		
PSE	DL-8	SP SEISMIC Z	40	ALL	1-10	29		
PSE	DL-1	LP SEISMIC X	41	ALL	1-10	4		
PSE	DL-8	SP SEISMIC Z	42	ALL	1-10	29		
PSE	DL-2	LP SEISMIC Y	43	ALL	1-10	4		
PSE	DL-8	SP SEISMIC Z	44	ALL	1-10	29		
PSE	DL-3	LP SEISMIC Z	45	ALL	1-10	4		
CONT	WD46*	CMD VERIFY & CAP WD	46	ALL	1-10	1		
SIDE	WD47*	SIDE WORD 3 OR 8	47	ALL	1-10	1		
PSE	DL-8	SP SEISMIC Z	48	ALL	1-10	29		
LSM	DM-25	X-AXIS FIELD	49	ALL	1-10	2		
PSE	DL-8	SP SEISMIC Z	50	ALL	1-10	29		
LSM	DM-26	Y-AXIS FIELD	51	ALL	1-10	2		
PSE	DL-8	SP SEISMIC Z	52	ALL	1-10	29		
LSM	DM-27	Z-AXIS FIELD	53	ALL	1-10	2		
PSE	DL-8	SP SEISMIC Z	54	ALL	1-10	29		
SWS	WD55*	SWS WORDS (0-185)	55	ALL	1-10	4		
SIDE	WD56*	SIDE WORD 4 OR 9	56	ALL	1-10	1		
PSE	DL-1	LP SEISMIC X	57	ALL	1-10	4		
PSE	DL-8	SP SEISMIC Z	58	ALL	1-10	29		
PSE	DL-2	LP SEISMIC Y	59	ALL	1-10	4		
PSE	DL-8	SP SEISMIC Z	60	ALL	1-10	29		
PSE	DL-3	LP SEISMIC Z	61	ALL	1-10	4		
PSE	DL-8	SP SEISMIC Z	62	ALL	1-10	29		
SIDE	WD63*	SIDE WORD 5 OR 10	63	ALL	1-10	1		
PSE	DL-8	SP SEISMIC Z	64	ALL	1-10	29		

1.1.1.2 ALSEP System Control Words (CONT)

Control and support of the ALSEP system is monitored through 5 main frame ALSEP words: 1, 2, 3, 33, and 46.

1.1.1.2.1 ALSEP Words 1, 2, and 3

The first 22-bits included in words 1, 2, and 3 contain the main frame sync. Bits 3 through 9 of ALSEP Word 3 contains the frame counter used to identify the parameters output by the 90-channel subcommutator. The frame counter counts from 1-89 then resets to 0 upon reaching the 90th channel. Loss of synchronization between the frame counter and 90 channel subcommutator may cause up to 54 seconds of invalid data. Bit-10 of Word 3 is the Mode Bit, which identifies Bit Rate or ALSEP ID on designated frames according to the frame counter. The configuration of the three words is as shown below:

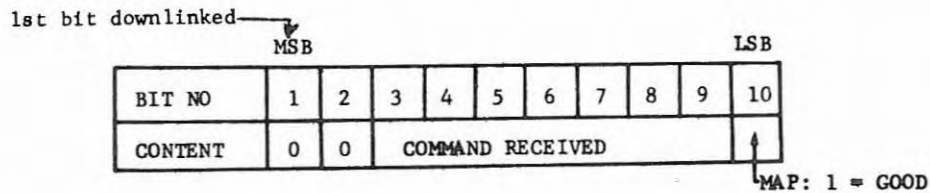


FRM	MODE BIT
1 : 1	= Normal Data Rate
2 : 1	= Slow Data Rate
3 : 0 (MSB)	} ALSEP 1 Data Proc. Serial No.
4 : 1	
5 : 0 (LSB)	

Mode Bit = 0 for all other frames.

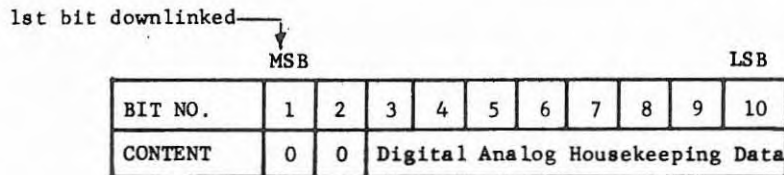
1.1.1.2.2 ALSEP WORD46 - Command Verification Word

Command Verification is provided in ALSEP Word 46. The Configuration is shown below. Bits 3 through 9 reflect the 7-bit command as received by ALSEP, and bit-10 is a message acceptance pulse (MAP). The MAP reads out a "1" when an error check has been successful and a command has been acted upon. The Command Verification Word reads zeroes except during the one ALSEP main frame following receipt of a command.



1.1.1.2.3 ALSEP WORD33 - Housekeeping

ALSEP Word 33 is the output of the 90-channel subcommutator. The 90 parameters of housekeeping data (voltages, temperatures, etc.) have the configuration as shown below. Some of the channels are used by the experiments. Word 33 has no self-contained data sync and parameter identification is by reading the 90-channel frame counter in ALSEP Word 3.



1.1.1.2.4 CONT PARAMETER LISTING

DOWNLINK LISTINGS COLUMN HEADERS

Col.	1	Experiment name.
Col.	2	Measurement number. (An asterisk in col. 11 indicates that the word is subcommand)
Col.	3	Measurement name.
Col.	4	ALSEP main frame (1-64) word. An asterisk in this column indicates that experiment's words are asynchronous with respect to the ALSEP main frame word.
Col.	5	ALSEP frame. The ALSEP frame number as read from the ALSEP frame counter in ALSEP word 3. The ALSEP frame counter counts from 1-89, and then to 0, which represents 90. Columns 46-48 may contain one of the following words: ALL = All ALSEP main frames EVN = Even numbered ALSEP main frames ODD = Odd numbered ALSEP main frames. An asterisk in this column indicates that this parameter is asynchronous with respect to the ALSEP frame.
Col.	6	Bits. Indicates which of the ten bits (1-10) of an ALSEP or experiment word contain the measurement number given in columns 7-11.
Col.	7	Samples per Main Frame (S/MF). Indicates how often (on the average) a parameter appears in the ALSEP main frame.
Col.	8	Experiment word. For the LSM these columns indicate the LSM word number (1-16) For the SIDE these columns indicate the SIDE word number (1-10) For the SWS these columns indicate the SWS word number (0-185)
Col.	9	Experiment Frame. For the SWS these columns indicate the SWS sequence number (0-15) For the SIDE these columns indicate the SIDE frame number (0-127)
Col.	10	Flag bits.

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD	FRM	BITS	S/MF	EXPERIMENT WD	FRAME	FG BT
CONT	DA-1A	SYNC (1110001001)	1	ALL	1-10	1			
CONT	DA-1B	SYNC (0000111011)	2	ALL	1-10	1			
CONT	DA-1C	SYNC (01)	3	ALL	1-2	1			
CONT	DA-2	FRAME COUNTER (1-89,0)	3	ALL	3-9	1			
CONT	DA-3A	MODE,BIT RATE ID (1=NORMAL)	3	1	10	1/90			
CONT	DA-3B	MODE,BIT RATE ID (1=SLOW)	3	2	10	1/90			
CONT	DA-4A	MODE,ALSEP ID (0) (MSB)	3	3	10	1/90			
CONT	DA-4B	MODE,ALSEP ID (1)	3	4	10	1/90			
CONT	DA-4C	MODE,ALSEP ID (0) (LSB)	3	5	10	1/90			
CONT		MODE,FILL ZERO	3	6-0	10	85/90			
CONT	DA-7	FILL ZEROS	33	ALL	1-2	1			
CONT	AE-3	CONV INPUT VOLT.	33	1	3-10	1/90			
CONT	AE-1	ADC CAL 0.25V	33	2	3-10	1/90			
CONT	AE-2	ADC CAL 4.75V	33	3	3-10	1/90			
CONT	AT-3	THERMAL PLATE-1 TEMP	33	4	3-10	1/90			
CONT	AE-4	CONV INPUT CUR	33	5	3-10	1/90			
CONT	AR-1	HOT FRAME-1 TEMP	33	6	3-10	1/90			
CONT	AR-4	COLD FRAME-1 TEMP	33	7	3-10	1/90			
CONT	AE-5	SHUNT REG-1 CUR	33	8	3-10	1/90			
CONT	AB-1	RCVR.1KHZ SC PRES	33	9	3-10	1/90			
CONT		UNASSIGNED	33	10	3-10				
CONT		UNASSIGNED	33	11	3-10				
CONT	AB-4	PD, EXP # 1&2	33	12	3-10	1/90			
CONT	AE-6	SHUNT REG-2 CUR	33	13	3-10	1/90			
CONT	AB-5	PD, EXP # 3&4 & DSS HTR 2	33	14	3-10	1/90			
CONT	AT-10	BOTTOM STRUCTURE-3 TEMP	33	15	3-10	1/90			
CONT	AT-21	LOCAL OSC. CRYSTAL A TEMP	33	16	3-10	1/90			
CONT	AT-22	LOCAL OSC. CRYSTAL B TEMP	33	17	3-10	1/90			
CONT	AT-23	XMTR A CRYSTAL TEMP	33	18	3-10	1/90			
CONT	AT-24	XMTR A HEAT SINK TEMP	33	19	3-10	1/90			
CONT	AE-7	PCU OUT VOLT-1(29V)	33	20	3-10	1/90			
CONT	AE-13	RCVR.PRE-LIMIT. LEV	33	21	3-10	1/90			
CONT	AE-18	XMTR. B,DC, PD	33	22	3-10	1/90			
CONT	AL-1	L.P.AMPL.GAIN(X&Y)	33	23	3-10	1/90			

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD FRM	BITS	S/MF	EXPERIMENT WD FRAME	FG BT
CONT	AL-5	LEV.MODE&CRS.SENS.MODE	33	24	3-10	1/90	
CONT		UNASSIGNED	33	25	3-10		
CONT	AX-5	2 CELL OUTPUT	33	26	3-10	1/90	
CONT	AT-1	SUNSHIELD-1 TEMP	33	27	3-10	1/90	
CONT	AT-4	THERMAL PLATE-2 TEMP	33	28	3-10	1/90	
CONT		UNASSIGNED	33	29	3-10		
CONT	AX-2	2 CELL TEMP	33	30	3-10	1/90	
CONT	AT-25	XMTR B CRYSTAL TEMP	33	31	3-10	1/90	
CONT	AT-26	XMTR B HEAT SINK TEMP	33	32	3-10	1/90	
CONT	AT-27	ANALOG DP, BASE TEMP	33	33	3-10	1/90	
CONT	AT-28	ANALOG DP, INT TEMP	33	34	3-10	1/90	
CONT	AE-8	PCU OUT VOLT-2(15V)	33	35	3-10	1/90	
CONT	AE-14	RCVR.LOCAL OSC LEV	33	36	3-10	1/90	
CONT		UNASSIGNED	33	37	3-10		
CONT	AL-2	L.P.AMPL.GAIN(Z)	33	38	3-10	1/90	
CONT	AL-6	THERM.CTL.STAT.	33	39	3-10	1/90	
CONT		UNASSIGNED	33	40	3-10		
CONT	AX-6	3 CELL OUTPUT	33	41	3-10	1/90	
CONT	AT-2	SUNSHIELD-2 TEMP	33	42	3-10	1/90	
CONT	AT-5	THERMAL PLATE-3 TEMP	33	43	3-10	1/90	
CONT		UNASSIGNED	33	44	3-10		
CONT		UNASSIGNED	33	45	3-10		
CONT	AT-29	DIGITAL DP, BASE TEMP	33	46	3-10	1/90	
CONT	AT-30	DIGITAL DP, INT TEMP	33	47	3-10	1/90	
CONT	AT-31	CMD DECODER, BASE TEMP	33	48	3-10	1/90	
CONT	AT-32	CMD DECODER, INT TEMP	33	49	3-10	1/90	
CONT	AE-9	PCU OUT VOLT-3(12V)	33	50	3-10	1/90	
CONT	AE-15	XMTR. A, AGC VOLT	33	51	3-10	1/90	
CONT	AR-3	HOT FRAME-3 TEMP	33	52	3-10	1/90	
CONT	AL-3	LEV.DIR&SPEED	33	53	3-10	1/90	
CONT	AL-7	CAL.STAT.L.P.&S.P.	33	54	3-10	1/90	
CONT		UNASSIGNED	33	55	3-10		
CONT	AX-3	3 CELL TEMP	33	56	3-10	1/90	
CONT		UNASSIGNED	33	57	3-10		
CONT	AT-6	THERMAL PLATE-4 TEMP	33	58	3-10	1/90	

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD	FRM	BITS	S/MF	EXPERIMENT WD	FG FRAME	BT
CONT	AT-8	LEFT SIDE STRUCTURE-1 TEMP	33	59	3-10	1/90			
CONT	AT-12	INNER MULTILAYER INS TEMP	33	60	3-10	1/90			
CONT	AT-33	CMD DEMOD VCO TEMP	33	61	3-10	1/90			
CONT	AT-34	PDU, BASE TEMP	33	62	3-10	1/90			
CONT	AT-35	PDU, INT TEMP	33	63	3-10	1/90			
CONT	AT-36	PCU, POWER OSC-1 TEMP	33	64	3-10	1/90			
CONT	AE-10	PCU OUT VOLT-4(5V)	33	65	3-10	1/90			
CONT	AE-16	XMTR. B AGC VOLT	33	66	3-10	1/90			
CONT	AR-5	COLD FRAME-2 TEMP	33	67	3-10	1/90			
CONT	AL-4	S.P.AMPL.GAIN(Z)	33	68	3-10	1/90			
CONT	AL-8	UNCAGE STATUS	33	69	3-10	1/90			
CONT	AI-1	LOW ENG DETECT CT.RT	33	70	3-10	1/90			
CONT	AT-7	THERMAL PLATE-5 TEMP	33	71	3-10	1/90			
CONT	AT-13	OUTER MULTILAYER INS TEMP	33	72	3-10	1/90			
CONT		UNASSIGNED	33	73	3-10				
CONT		UNASSIGNED	33	74	3-10				
CONT		UNASSIGNED	33	75	3-10				
CONT	AT-37	PCU, POWER OSC-2 TEMP	33	76	3-10	1/90			
CONT	AT-38	PCU, REGULATOR-1 TEMP	33	77	3-10	1/90			
CONT	AT-39	PCU, REGULATOR-2 TEMP	33	78	3-10	1/90			
CONT	AE-11	PCU, OUT VOLT-5(-12V)	33	79	3-10	1/90			
CONT	AE-12	PCU, OUT VOLT-6(-6V)	33	80	3-10	1/90			
CONT	AE-17	XMTR. A,DC, PD	33	81	3-10	1/90			
CONT		UNASSIGNED	33	82	3-10				
CONT	AX-1	1 CELL TEMP	33	83	3-10	1/90			
CONT	AX-4	1 CELL OUTPUT	33	84	3-10	1/90			
CONT	AI-2	HI ENG DETECT CT.RT	33	85	3-10	1/90			
CONT		UNASSIGNED	33	86	3-10				
CONT	AT-9	RIGHT SIDE STRUCTURE-2 TEMP	33	87	3-10	1/90			
CONT	AT-11	BACK STRUCTURE-4 TEMP	33	88	3-10	1/90			
CONT		UNASSIGNED	33	89	3-10				
CONT		UNASSIGNED	33	0	3-10				
CONT	DA-7	FILL ZEROS	46	ALL	1-2	1			
CONT	DA-5	RECVD CMD MESSAGE	46	ALL	3-9	1			
CONT	DA-6	CMD MAP	46	ALL	10	1			

1.1.1.3 PASSIVE SEISMIC EXPERIMENT (PSE)

1.1.1.3.1 PSE DOWNLINK DESCRIPTION

Scientific Measurements

8 PSE scientific parameters are output in 4 ALSEP main frame words. The PSE words are 10-bits of digital converted analog data.

S.P. Z-axis data is supercommutated into 29 of the main frame words.

L.P. X-axis data, L.P. Y-axis data, and L.P. Z-axis data are supercommutated into 4 main frame words each (total of 12 main frame words).

Two main frame words, 35 and 37, contain 2-channel subcommutators. Content of the main frame words is identified by the LSB of the 90-channel frame counter in ALSEP Word 3, as follows:

LSB	ALSEP FRAME	ALSEP WORD	CONTENT
"0"	Even	35	Tidal X-Axis
"0"	Even	37	Tidal Y-Axis
"1"	Odd	35	Tidal Z-Axis
"1"	Odd	37	Sensor Unit Temp

Engineering Status

There are 8 parameters of 8-bit housekeeping data which are read out in ALSEP Word 33.

1.1.1.3.2 PSE PARAMETER LISTING

DOWNLINK LISTINGS COLUMN HEADERS

- Col. 1 Experiment name.
- Col. 2 Measurement number. (An asterisk in col. 11 indicates that the word is subcommand)
- Col. 3 Measurement name.
- Col. 4 ALSEP main frame (1-64) word. An asterisk in this column indicates that experiment's words are asynchronous with respect to the ALSEP main frame word.
- Col. 5 ALSEP frame. The ALSEP frame number as read from the ALSEP frame counter in ALSEP word 3. The ALSEP frame counter counts from 1-89, and then to 0, which represents 90. Columns 46-48 may contain one of the following words:
- ALL = All ALSEP main frames
 - EVN = Even numbered ALSEP main frames
 - ODD = Odd numbered ALSEP main frames.
- An asterisk in this column indicates that this parameter is asynchronous with respect to the ALSEP frame.
- Col. 6 Bits. Indicates which of the ten bits (1-10) of an ALSEP or experiment word contain the measurement number given in columns 7-11.
- Col. 7 Samples per Main Frame (S/MF). Indicates how often (on the average) a parameter appears in the ALSEP main frame.
- Col. 8 Experiment word. For the LSM these columns indicate the LSM word number (1-16)
For the SIDE these columns indicate the SIDE word number (1-10)
For the SWS these columns indicate the SWS word number (0-185)
- Col. 9 Experiment Frame. For the SWS these columns indicate the SWS sequence number (0-15)
For the SIDE these columns indicate the SIDE frame number (0-127)
- Col. 10 Flag bits.

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD	FRM	BITS	S/MF	EXPERIMENT WD	FG FRAME	BT
PSE	DL-8	SP SEISMIC Z	4	ALL	1-10				29
PSE	DL-8	SP SEISMIC Z	6	ALL	1-10				29
PSE	DL-8	SP SEISMIC Z	8	ALL	1-10				29
PSE	DL-1	LP SEISMIC X	9	ALL	1-10				4
PSE	DL-8	SP SEISMIC Z	10	ALL	1-10				29
PSE	DL-2	LP SEISMIC Y	11	ALL	1-10				4
PSE	DL-8	SP SEISMIC Z	12	ALL	1-10				29
PSE	DL-3	LP SEISMIC Z	13	ALL	1-10				4
PSE	DL-8	SP SEISMIC Z	14	ALL	1-10				29
PSE	DL-8	SP SEISMIC Z	16	ALL	1-10				29
PSE	DL-8	SP SEISMIC Z	18	ALL	1-10				29
PSE	DL-8	SP SEISMIC Z	20	ALL	1-10				29
PSE	DL-8	SP SEISMIC Z	22	ALL	1-10				29
PSE	DL-8	SP SEISMIC Z	24	ALL	1-10				29
PSE	DL-1	LP SEISMIC X	25	ALL	1-10				4
PSE	DL-8	SP SEISMIC Z	26	ALL	1-10				29
PSE	DL-2	LP SEISMIC Y	27	ALL	1-10				4
PSE	DL-8	SP SEISMIC Z	28	ALL	1-10				29
PSE	DL-3	LP SEISMIC Z	29	ALL	1-10				4
PSE	DL-8	SP SEISMIC Z	30	ALL	1-10				29
PSE	DL-8	SP SEISMIC Z	32	ALL	1-10				29
PSE	DL-8	SP SEISMIC Z	34	ALL	1-10				29
PSE	DL-4	TIDAL X	35	EVN	1-10				1/2
PSE	DL-6	TIDAL Z	35	ODD	1-10				1/2
PSE	DL-8	SP SEISMIC Z	36	ALL	1-10				29
PSE	DL-5	TIDAL Y	37	EVN	1-10				1/2
PSE	DL-7	SENSOR UNIT TEMP	37	ODD	1-10				1/2
PSE	DL-8	SP SEISMIC Z	38	ALL	1-10				29
PSE	DL-8	SP SEISMIC Z	40	ALL	1-10				29
PSE	DL-1	LP SEISMIC X	41	ALL	1-10				4
PSE	DL-8	SP SEISMIC Z	42	ALL	1-10				29
PSE	DL-2	LP SEISMIC Y	43	ALL	1-10				4
PSE	DL-8	SP SEISMIC Z	44	ALL	1-10				29
PSE	DL-3	LP SEISMIC Z	45	ALL	1-10				4
PSE	DL-8	SP SEISMIC Z	48	ALL	1-10				29
PSE	DL-8	SP SEISMIC Z	50	ALL	1-10				29
PSE	DL-8	SP SEISMIC Z	52	ALL	1-10				29
PSE	DL-8	SP SEISMIC Z	54	ALL	1-10				29
PSE	DL-1	LP SEISMIC X	57	ALL	1-10				4
PSE	DL-8	SP SEISMIC Z	58	ALL	1-10				29
PSE	DL-2	LP SEISMIC Y	59	ALL	1-10				4
PSE	DL-8	SP SEISMIC Z	60	ALL	1-10				29
PSE	DL-3	LP SEISMIC Z	61	ALL	1-10				4
PSE	DL-8	SP SEISMIC Z	62	ALL	1-10				29
PSE	DL-8	SP SEISMIC Z	64	ALL	1-10				29

1.1-14

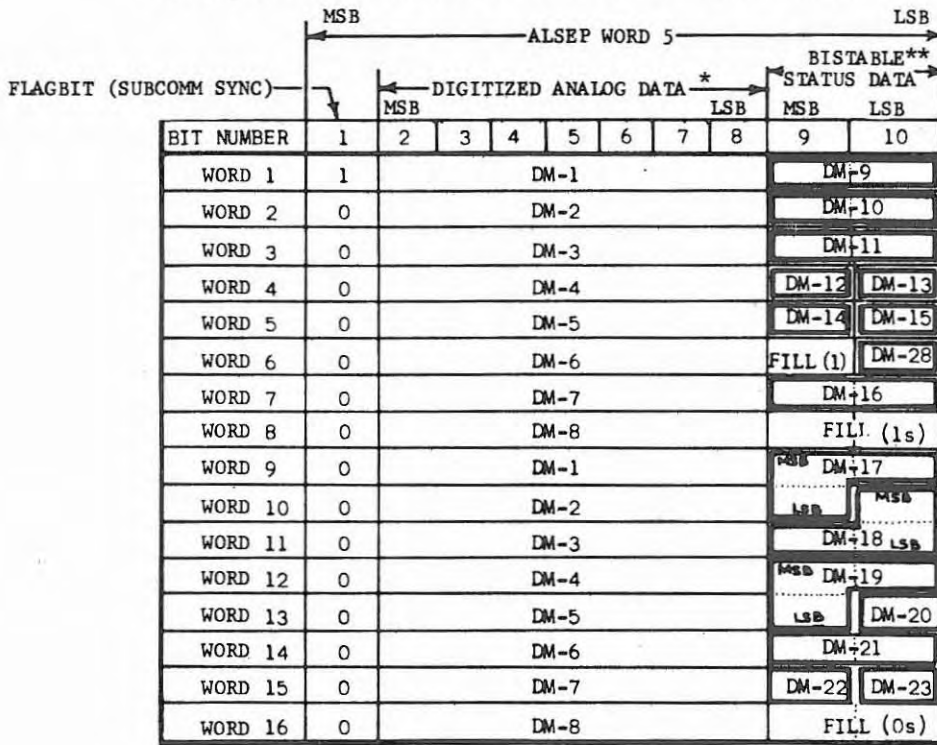
1.1.1.4 Lunar Surface Magnetometer Experiment (LSM)

1.1.1.4.1 LSM Downlink Description

The LSM is allotted words 5, 17, 19, 21, 49, 51, and 53 in the ALSEP main frame. ALSEP word 5 provides LSM engineering status, and the remaining six ALSEP words provide LSM scientific data.

Engineering Measurements

ALSEP word 5 carries a 16 channel subcomm (words 1 - 16). Since this subcomm is asynchronous with respect to the ALSEP frame count, a flagbit, to be used for subcomm sync, is placed in bit one of each word. The format of ALSEP word five is given below:

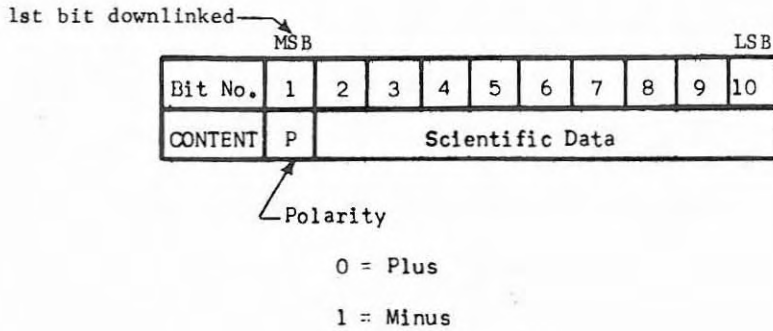


* Words 9-16 are a repeat Words 1-8.

** 1-bit parameters show 2 states, "0" or "1"
 2-bit parameters show up to 4 states, "00" thru "11"
 3-bit parameters show up to 8 states, "000" thru "111"

Scientific Measurements

Three scientific measurements, the X-axis, Y-axis, and Z-axis measurements are supercommutated into ALSEP words 17, 19, and 21 and ALSEP words 49, 51, and 53, respectively. The bit configuration of these measurements is shown below.



1.1.1.4.2 LSM PARAMETER LISTING

DOWNLINK LISTINGS COLUMN HEADERS

Col.	1	Experiment name.
Col.	2	Measurement number. (An asterisk in col. 11 indicates that the word is subcommand)
Col.	3	Measurement name.
Col.	4	ALSEP main frame (1-64) word. An asterisk in this column indicates that experiment's words are asynchronous with respect to the ALSEP main frame word.
Col.	5	ALSEP frame. The ALSEP frame number as read from the ALSEP frame counter in ALSEP word 3. The ALSEP frame counter counts from 1-89, and then to 0, which represents 90. Columns 46-48 may contain one of the following words: ALL = All ALSEP main frames EVN = Even numbered ALSEP main frames ODD = Odd numbered ALSEP main frames. An asterisk in this column indicates that this parameter is asynchronous with respect to the ALSEP frame.
Col.	6	Bits. Indicates which of the ten bits (1-10) of an ALSEP or experiment word contain the measurement number given in columns 7-11.
Col.	7	Samples per Main Frame (S/MF). Indicates how often (on the average) a parameter appears in the ALSEP main frame.
Col.	8	Experiment word. For the LSM these columns indicate the LSM word number (1-16) For the SIDE these columns indicate the SIDE word number (1-10) For the SWS these columns indicate the SWS word number (0-185)
Col.	9	Experiment Frame. For the SWS these columns indicate the SWS sequence number (0-15) For the SIDE these columns indicate the SIDE frame number (0-127)
Col.	10	Flag bits.

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD	FRM	BITS	S/MF	LSM WD	LSM FRAME	FG BT
LSM	DM-1	TEMP-1	5	*	2-8	2/16	1		1
LSM	DM-9	X-FLIP POSITION	5	*	9-10	1/16	1		1
LSM	DM-2	TEMP-2	5	*	2-8	2/16	2		0
LSM	DM-10	Y-FLIP POSITION	5	*	9-10	1/16	2		0
LSM	DM-3	TEMP-3	5	*	2-8	2/16	3		0
LSM	DM-11	Z-FLIP POSITION	5	*	9-10	1/16	3		0
LSM	DM-4	TEMP-4	5	*	2-8	2/16	4		0
LSM	DM-12	X-GIMBAL POSITION	5	*	9	1/16	4		0
LSM	DM-13	Y-GIMBAL POSITION	5	*	10	1/16	4		0
LSM	DM-5	TEMP-5	5	*	2-8	2/16	5		0
LSM	DM-14	Z-GIMBAL POSITION	5	*	9	1/16	5		0
LSM	DM-15	THERMAL CONTROL SELECT	5	*	10	1/16	5		0
LSM	DM-6	LEVEL SENSOR-1	5	*	2-8	2/16	6		0
LSM		FILLER BITS (1)	5	*	9	1/16	6		0
LSM	DM-28	HEATER POWER STATUS	5	*	10	1/16	6		C
LSM	DM-7	LEVEL SENSOR-2	5	*	2-8	2/16	7		0
LSM	DM-16	MEASUREMENT RANGE	5	*	9-10	1/16	7		0
LSM	DM-8	SUPPLY VOLTAGE	5	*	2-8	2/16	8		0
LSM	DM-29	FILLER BITS (ONES)	5	*	9-10	1/16	8		0
LSM	DM-1	TEMP-1	5	*	2-8	2/16	9		0
LSM	DM-17	X-OFFSET FIELD	5	*	9-10	1/16	9		0
LSM	DM-2	TEMP-2	5	*	2-8	2/16	10		0
LSM	DM-17	X-OFFSET FIELD	5	*	9	1/16	10		0
LSM	DM-18	Y-OFFSET FIELD	5	*	10	1/16	10		0
LSM	DM-3	TEMP-3	5	*	2-8	2/16	11		0
LSM	DM-18	Y-OFFSET FIELD	5	*	9-10	1/16	11		0
LSM	DM-4	TEMP-4	5	*	2-8	2/16	12		0
LSM	DM-19	Z-OFFSET FIELD	5	*	9-10	1/16	12		0
LSM	DM-5	TEMP-5	5	*	2-8	2/16	13		0
LSM	DM-19	Z-OFFSET FIELD	5	*	9	1/16	13		0
LSM	DM-20	MODE STATE	5	*	10	1/16	13		0
LSM	DM-6	LEVEL SENSOR-1	5	*	2-8	2/16	14		0
LSM	DM-21	OFFSET ADDRESS	5	*	9-10	1/16	14		0
LSM	DM-7	LEVEL SENSOR-2	5	*	2-8	2/16	15		0
LSM	DM-22	FILTER IN/OUT	5	*	9	1/16	15		0
LSM	DM-23	FLIP/CAL INHIBIT STATUS	5	*	10	1/16	15		0
LSM	DM-8	SUPPLY VOLTAGE	5	*	2-8	2/16	16		0
LSM	DM-24	FILLER BITS (ZEROS)	5	*	9-10	1/16	16		0
LSM	DM-25	X-AXIS FIELD	17	ALL	1-10	2			
LSM	DM-26	Y-AXIS FIELD	19	ALL	1-10	2			
LSM	DM-27	Z-AXIS FIELD	21	ALL	1-10	2			
LSM	DM-25	X-AXIS FIELD	49	ALL	1-10	2			
LSM	DM-26	Y-AXIS FIELD	51	ALL	1-10	2			
LSM	DM-27	Z-AXIS FIELD	53	ALL	1-10	2			

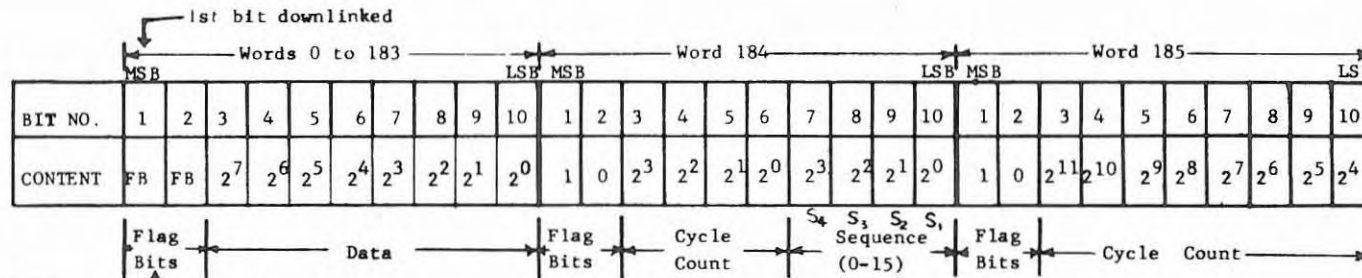
1.1.1.5 SOLAR WIND SPECTROMETER (SWS)

1.1.1.5.1 SWS DOWNLINK DESCRIPTION

The SWS is allotted words 7, 23, 39, and 55 in the ALSEP main frame. These words form a four word supercommutation of the SWS data. The format of the SWS data is as follows:

4 SWS words = 1 ALSEP main frame
 186 SWS words = 1 SWS sequence = 46.5 ALSEP main frames
 16 SWS sequences = 1 SWS cycle = 744 ALSEP main frames

Since SWS data is asynchronous with respect to ALSEP frame and word, ID data is provided in SWS words 184 and 185 of each sequence. Word 184 contains a four bit sequence counter. A Cycle Counter is contained in words 184 and 185. The Cycle Counter will advance once for 16 sequences. When the Cycle Counter in Word 184 is full it will carry over into Word 185. All SWS words have two flag bits in the two MSB positions. The formats of a normal SWS word and words 184 and 185 are given below:



Scientific Data = 00
 Calibration Data = 01

The format of the SWS sequences are as follows:

- (1) SWS Words 0 through 111 and 128 through 183 are identical in sequences 0 through 13. Sequences 14 and 15 are identical to sequences 0 through 13 with the exception of words 0, 8, 16, 24,, 104, 128, 136,, 176. In sequence 14 these words contain DC calibration data. In sequence 15 these words contain AC calibration data.
- (2) SWS words 112 through 119 read out A/D calibration data on even sequences and engineering data on odd sequences.
- (3) SWS words 120 through 127 read out current calibration data which steps to a different level each sequence for four sequences, then recycles.

The following pages show Matrices for Sequences 0 through 13, 14, and 15.

SOLAR WIND SPECTROMETER (SWS) MEASUREMENTS - SEQUENCES 0 - 13

PROTON FLUX

Voltage Level #1	0	1	2	3	4	5	6	7
	DY-1	DY-2	DY-3	DY-4	DY-5	DY-6	DY-7	DY-8
2	8	9	10	11	12	13	14	15
	DY-9	DY-10	DY-11	DY-12	DY-13	DY-14	DY-15	DY-16
3	16	17	18	19	20	21	22	23
	DY-17	DY-18	DY-19	DY-20	DY-21	DY-22	DY-23	DY-24
4	24	25	26	27	28	29	30	31
	DY-25	DY-26	DY-27	DY-28	DY-29	DY-30	DY-31	DY-32
5	32	33	34	35	36	37	38	39
	DY-33	DY-34	DY-35	DY-36	DY-37	DY-38	DY-39	DY-40
6	40	41	42	43	44	45	46	47
	DY-41	DY-42	DY-43	DY-44	DY-45	DY-46	DY-47	DY-48
7	48	49	50	51	52	53	54	55
	DY-49	DY-50	DY-51	DY-52	DY-53	DY-54	DY-55	DY-56
8	56	57	58	59	60	61	62	63
	DY-57	DY-58	DY-59	DY-60	DY-61	DY-62	DY-63	DY-64
9	64	65	66	67	68	69	70	71
	DY-65	DY-66	DY-67	DY-68	DY-69	DY-70	DY-71	DY-72
10	72	73	74	75	76	77	78	79
	DY-73	DY-74	DY-75	DY-76	DY-77	DY-78	DY-79	DY-80
11	80	81	82	83	84	85	86	87
	DY-81	DY-82	DY-83	DY-84	DY-85	DY-86	DY-87	DY-88
12	88	89	90	91	92	93	94	95
	DY-89	DY-90	DY-91	DY-92	DY-93	DY-94	DY-95	DY-96
13	96	97	98	99	100	101	102	103
	DZ-1	DZ-2	DZ-3	DZ-4	DZ-5	DZ-6	DZ-7	DZ-8
14	104	105	106	107	108	109	110	111
	DZ-9	DZ-10	DZ-11	DZ-12	DZ-13	DZ-14	DZ-15	DZ-16

Engineering Data

A/D CALIBRATION								S ₁
112	113	114	115	116	117	118	119	0
DW-3	DW-4	DW-5	DW-6	DW-7	DW-3	DW-5	DW-7	
112	113	114	115	116	117	118	119	1
DW-11	DW-12	DW-13	DW-14	DW-15	DW-16	DW-17	DW-18	

CURRENT CALIBRATION

								S ₂	S ₁
120	121	122	123	124	125	126	127	0	0
DW-19	DW-20	DW-21	DW-22	DW-23	DW-24	DW-25	DW-26		
120	121	122	123	124	125	126	127	0	1
DW-27	DW-28	DW-29	DW-30	DW-31	DW-32	DW-33	DW-34		
120	121	122	123	124	125	126	127	1	0
DW-35	DW-36	DW-37	DW-38	DW-39	DW-40	DW-41	DW-42		
120	121	122	123	124	125	126	127	1	1
DW-43	DW-44	DW-45	DW-46	DW-47	DW-48	DW-49	DW-50		

ELECTRON FLUX

Voltage Level	128	129	130	131	132	133	134	135		
15	DZ-17	DZ-18	DZ-19	DZ-20	DZ-21	DZ-22	DZ-23	DZ-24		
	136	137	138	139	140	141	142	143		
16	DZ-25	DZ-26	DZ-27	DZ-28	DZ-29	DZ-30	DZ-31	DZ-32		
	144	145	146	147	148	149	150	151		
17	DZ-33	DZ-34	DZ-35	DZ-36	DZ-37	DZ-38	DZ-39	DZ-40		
	152	153	154	155	156	157	158	159		
18	DZ-41	DZ-42	DZ-43	DZ-44	DZ-45	DZ-46	DZ-47	DZ-48		
	160	161	162	163	164	165	166	167		
19	DZ-49	DZ-50	DZ-51	DZ-52	DZ-53	DZ-54	DZ-55	DZ-56		
	168	169	170	171	172	173	174	175		
20	DZ-57	DZ-58	DZ-59	DZ-60	DZ-61	DZ-62	DZ-63	DZ-64	SYNC & ID	
	176	177	178	179	180	181	182	183	184	185
21	DZ-65	DZ-66	DZ-67	DZ-68	DZ-69	DZ-70	DZ-71	DZ-72	DW-1	DW-2

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1.1-21

SOLAR WIND SPECTROMETER (SWS) MEASUREMENTS- SEQUENCE 14

PROTON FLUX

Voltage Level #1	0	1	2	3	4	5	6	7
	DW-51	DY-2	DY-3	DY-4	DY-5	DY-6	DY-7	DY-8
2	8	9	10	11	12	13	14	15
	DW-52	DY-10	DY-11	DY-12	DY-13	DY-14	DY-15	DY-16
3	16	17	18	19	20	21	22	23
	DW-53	DY-18	DY-19	DY-20	DY-21	DY-22	DY-23	DY-24
4	24	25	26	27	28	29	30	31
	DW-54	DY-26	DY-27	DY-28	DY-29	DY-30	DY-31	DY-32
5	32	33	34	35	36	37	38	39
	DW-55	DY-34	DY-35	DY-36	DY-37	DY-38	DY-39	DY-40
6	40	41	42	43	44	45	46	47
	DW-56	DY-42	DY-43	DY-44	DY-45	DY-46	DY-47	DY-48
7	48	49	50	51	52	53	54	55
	DW-57	DY-50	DY-51	DY-52	DY-53	DY-54	DY-55	DY-56
8	56	57	58	59	60	61	62	63
	DW-58	DY-58	DY-59	DY-60	DY-61	DY-62	DY-63	DY-64
9	64	65	66	67	68	69	70	71
	DW-59	DY-66	DY-67	DY-68	DY-69	DY-70	DY-71	DY-72
10	72	73	74	75	76	77	78	79
	DW-60	DY-74	DY-75	DY-76	DY-77	DY-78	DY-79	DY-80
11	80	81	82	83	84	85	86	87
	DW-61	DY-82	DY-83	DY-84	DY-85	DY-86	DY-87	DY-88
12	88	89	90	91	92	93	94	95
	DW-62	DY-90	DY-91	DY-92	DY-93	DY-94	DY-95	DY-96
13	96	97	98	99	100	101	102	103
	DW-63	DZ-2	DZ-3	DZ-4	DZ-5	DZ-6	DZ-7	DZ-8
14	104	105	106	107	108	109	110	111
	DW-64	DZ-10	DZ-11	DZ-12	DZ-13	DZ-14	DZ-15	DZ-16

ENGINEERING DATA

112	113	114	115	116	117	118	119
DW-3	DW-4	DW-5	DW-6	DW-7	DW-3	DW-5	DW-7

CURRENT CALIBRATION DATA

120	121	122	123	124	125	126	127
DW-35	DW-36	DW-37	DW-38	DW-39	DW-40	DW-41	DW-42

ELECTRON FLUX

Voltage Level	128	129	130	131	132	133	134	135
	DW-65	DZ-18	DZ-19	DZ-20	DZ-21	DZ-22	DZ-23	DZ-24
15	136	137	138	139	140	141	142	143
	DW-66	DZ-26	DZ-27	DZ-28	DZ-29	DZ-30	DZ-31	DZ-32
16	144	145	146	147	148	149	150	151
	DW-67	DZ-34	DZ-35	DZ-36	DZ-37	DZ-38	DZ-39	DZ-40
17	152	153	154	155	156	157	158	159
	DW-68	DZ-42	DZ-43	DZ-44	DZ-45	DZ-46	DZ-47	DZ-48
18	160	161	162	163	164	165	166	167
	DW-69	DZ-50	DZ-51	DZ-52	DZ-53	DZ-54	DZ-55	DZ-56
19	168	169	170	171	172	173	174	175
	DW-70	DZ-58	DZ-59	DZ-60	DZ-61	DZ-62	DZ-63	DZ-64
20	176	177	178	179	180	181	182	183
	DW-71	DZ-66	DZ-67	DZ-68	DZ-69	DZ-70	DZ-71	DZ-72
21	184	185	SYNC & ID					
	DW-1	DW-2						

1.1-22

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1.1.1.5.2 SWS PARAMETER LISTING

DOWNLINK LISTINGS COLUMN HEADERS

Col.	1	Experiment name.
Col.	2	Measurement number. (An asterisk in col. 11 indicates that the word is subcommed)
Col.	3	Measurement name.
Col.	4	ALSEP main frame (1-64) word. An asterisk in this column indicates that experiment's words are asynchronous with respect to the ALSEP main frame word.
Col.	5	ALSEP frame. The ALSEP frame number as read from the ALSEP frame counter in ALSEP word 3. The ALSEP frame counter counts from 1-89, and then to 0, which represents 90. Columns 46-48 may contain one of the following words: ALL = All ALSEP main frames EVN = Even numbered ALSEP main frames ODD = Odd numbered ALSEP main frames. An asterisk in this column indicates that this parameter is asynchronous with respect to the ALSEP frame.
Col.	6	Bits. Indicates which of the ten bits (1-10) of an ALSEP or experiment word contain the measurement number given in columns 7-11.
Col.	7	Samples per Main Frame (S/MF). Indicates how often (on the average) a parameter appears in the ALSEP main frame.
Col.	8	Experiment word. For the LSM these columns indicate the LSM word number (1-16) For the SIDE these columns indicate the SIDE word number (1-10) For the SWS these columns indicate the SWS word number (0-185)
Col.	9	Experiment Frame. For the SWS these columns indicate the SWS sequence number (0-15) For the SIDE these columns indicate the SIDE frame number (0-127)
Col.	10	Flag bits.

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD	FRM	BITS	S/MF	SWS WD	SWS SEQ	FG BT
SWS	WD07*	SWS WORDS (0-185)	7	ALL	1-10	1			
SWS	WD23*	SWS WORDS (0-185)	23	ALL	1-10	1			
SWS	WD39*	SWS WORDS (0-185)	39	ALL	1-10	1			
SWS	WD55*	SWS WORDS (0-185)	55	ALL	1-10	1			
SWS	DY-1	POS IONS-SUM-LEV 1	*	*	3-10	14/744	0	0-13	00
SWS	DW-51	DC HV CAL LEV-1 PROT	*	*	3-10	1/744	0	14	01
SWS	DW-72	AC HV CAL LEV-1 PROT	*	*	3-10	1/744	0	15	01
SWS	DY-2	POS IONS CUP-1 LEV-1	*	*	3-10	16/744	1	0-15	00
SWS	DY-3	POS IONS CUP-2 LEV-1	*	*	3-10	16/744	2	0-15	00
SWS	DY-4	POS IONS CUP-3 LEV-1	*	*	3-10	16/744	3	0-15	00
SWS	DY-5	POS IONS CUP-4 LEV-1	*	*	3-10	16/744	4	0-15	00
SWS	DY-6	POS IONS CUP-5 LEV-1	*	*	3-10	16/744	5	0-15	00
SWS	DY-7	POS IONS CUP-6 LEV-1	*	*	3-10	16/744	6	0-15	00
SWS	DY-8	POS IONS CUP-7 LEV-1	*	*	3-10	16/744	7	0-15	00
SWS	DY-9	POS IONS-SUM-LEV 2	*	*	3-10	14/744	8	0-13	00
SWS	DW-52	DC HV CAL LEV-2 PROT	*	*	3-10	1/744	8	14	01
SWS	DW-73	AC HV CAL LEV-2 PROT	*	*	3-10	1/744	8	15	01
SWS	DY-10	POS IONS CUP-1 LEV-2	*	*	3-10	16/744	9	0-15	00
SWS	DY-11	POS IONS CUP-2 LEV-2	*	*	3-10	16/744	10	0-15	00
SWS	DY-12	POS IONS CUP-3 LEV-2	*	*	3-10	16/744	11	0-15	00
SWS	DY-13	POS IONS CUP-4 LEV-2	*	*	3-10	16/744	12	0-15	00
SWS	DY-14	POS IONS CUP-5 LEV-2	*	*	3-10	16/744	13	0-15	00
SWS	DY-15	POS IONS CUP-6 LEV-2	*	*	3-10	16/744	14	0-15	00
SWS	DY-16	POS IONS CUP-7 LEV-2	*	*	3-10	16/744	15	0-15	00
SWS	DY-17	POS IONS-SUM-LEV 3	*	*	3-10	14/744	16	0-13	00
SWS	DW-53	DC HV CAL LEV-3 PROT	*	*	3-10	1/744	16	14	01
SWS	DW-74	AC HV CAL LEV-3 PROT	*	*	3-10	1/744	16	15	01
SWS	DY-18	POS IONS CUP-1 LEV-3	*	*	3-10	16/744	17	0-15	00
SWS	DY-19	POS IONS CUP-2 LEV-3	*	*	3-10	16/744	18	0-15	00
SWS	DY-20	POS IONS CUP-3 LEV-3	*	*	3-10	16/744	19	0-15	00
SWS	DY-21	POS IONS CUP-4 LEV-3	*	*	3-10	16/744	20	0-15	00
SWS	DY-22	POS IONS CUP-5 LEV-3	*	*	3-10	16/744	21	0-15	00
SWS	DY-23	POS IONS CUP-6 LEV-3	*	*	3-10	16/744	22	0-15	00
SWS	DY-24	POS IONS CUP-7 LEV-3	*	*	3-10	16/744	23	0-15	00
SWS	DY-25	POS IONS-SUM-LEV 4	*	*	3-10	14/744	24	0-13	00

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD	FRM	BITS	S/MF	SWS WD	SWS SEQ	FG BT
SWS	DW-54	DC HV CAL LEV-4 PROT	*	*	3-10	1/744	24	14	01
SWS	DW-75	AC HV CAL LEV-4 PROT	*	*	3-10	1/744	24	15	01
SWS	DY-26	POS IONS CUP-1 LEV-4	*	*	3-10	16/744	25	0-15	00
SWS	DY-27	POS IONS CUP-2 LEV-4	*	*	3-10	16/744	26	0-15	00
SWS	DY-28	POS IONS CUP-3 LEV-4	*	*	3-10	16/744	27	0-15	00
SWS	DY-29	POS IONS CUP-4 LEV-4	*	*	3-10	16/744	28	0-15	00
SWS	DY-30	POS IONS CUP-5 LEV-4	*	*	3-10	16/744	29	0-15	00
SWS	DY-31	POS IONS CUP-6 LEV-4	*	*	3-10	16/744	30	0-15	00
SWS	DY-32	POS IONS CUP-7 LEV-4	*	*	3-10	16/744	31	0-15	00
SWS	DY-33	POS IONS-SUM-LEV 5	*	*	3-10	14/744	32	0-13	00
SWS	DW-55	DC HV CAL LEV-5 PROT	*	*	3-10	1/744	32	14	01
SWS	DW-76	AC HV CAL LEV-5 PROT	*	*	3-10	1/744	32	15	01
SWS	DY-34	POS IONS CUP-1 LEV-5	*	*	3-10	16/744	33	0-15	00
SWS	DY-35	POS IONS CUP-2 LEV-5	*	*	3-10	16/744	34	0-15	00
SWS	DY-36	POS IONS CUP-3 LEV-5	*	*	3-10	16/744	35	0-15	00
SWS	DY-37	POS IONS CUP-4 LEV-5	*	*	3-10	16/744	36	0-15	00
SWS	DY-38	POS IONS CUP-5 LEV-5	*	*	3-10	16/744	37	0-15	00
SWS	DY-39	POS IONS CUP-6 LEV-5	*	*	3-10	16/744	38	0-15	00
SWS	DY-40	POS IONS CUP-7 LEV-5	*	*	3-10	16/744	39	0-15	00
SWS	DY-41	POS IONS-SUM-LEV 6	*	*	3-10	14/744	40	0-13	00
SWS	DW-56	DC HV CAL LEV-6 PROT	*	*	3-10	1/744	40	14	01
SWS	DW-77	AC HV CAL LEV-6 PROT	*	*	3-10	1/744	40	15	01
SWS	DY-42	POS IONS CUP-1 LEV-6	*	*	3-10	16/744	41	0-15	00
SWS	DY-43	POS IONS CUP-2 LEV-6	*	*	3-10	16/744	42	0-15	00
SWS	DY-44	POS IONS CUP-3 LEV-6	*	*	3-10	16/744	43	0-15	00
SWS	DY-45	POS IONS CUP-4 LEV-6	*	*	3-10	16/744	44	0-15	00
SWS	DY-46	POS IONS CUP-5 LEV-6	*	*	3-10	16/744	45	0-15	00
SWS	DY-47	POS IONS CUP-6 LEV-6	*	*	3-10	16/744	46	0-15	00
SWS	DY-48	POS IONS CUP-7 LEV-6	*	*	3-10	16/744	47	0-15	00
SWS	DY-49	POS IONS-SUM-LEV 7	*	*	3-10	14/744	48	0-13	00
SWS	DW-57	DC HV CAL LEV-7 PROT	*	*	3-10	1/744	48	14	01
SWS	DW-78	AC HV CAL LEV-7 PROT	*	*	3-10	1/744	48	15	01
SWS	DY-50	POS IONS CUP-1 LEV-7	*	*	3-10	16/744	49	0-15	00
SWS	DY-51	POS IONS CUP-2 LEV-7	*	*	3-10	16/744	50	0-15	00
SWS	DY-52	POS IONS CUP-3 LEV-7	*	*	3-10	16/744	51	0-15	00

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD FRM	BITS	S/MF	SWS WD	SWS SEQ	FG BT
SWS	DY-53	POS IONS CUP-4 LEV-7	*	*	3-10	16/744	52	0-15 00
SWS	DY-54	POS IONS CUP-5 LEV-7	*	*	3-10	16/744	53	0-15 00
SWS	DY-55	POS IONS CUP-6 LEV-7	*	*	3-10	16/744	54	0-15 00
SWS	DY-56	POS IONS CUP-7 LEV-7	*	*	3-10	16/744	55	0-15 00
SWS	DY-57	POS IONS-SUM-LEV 8	*	*	3-10	14/744	56	0-13 00
SWS	DW-58	DC HV CAL LEV-8 PROT	*	*	3-10	1/744	56	14 01
SWS	DW-79	AC HV CAL LEV-8 PROT	*	*	3-10	1/744	56	15 01
SWS	DY-58	POS IONS CUP-1 LEV-8	*	*	3-10	16/744	57	0-15 00
SWS	DY-59	POS IONS CUP-2 LEV-8	*	*	3-10	16/744	58	0-15 00
SWS	DY-60	POS IONS CUP-3 LEV-8	*	*	3-10	16/744	59	0-15 00
SWS	DY-61	POS IONS CUP-4 LEV-8	*	*	3-10	16/744	60	0-15 00
SWS	DY-62	POS IONS CUP-5 LEV-8	*	*	3-10	16/744	61	0-15 00
SWS	DY-63	POS IONS CUP-6 LEV-8	*	*	3-10	16/744	62	0-15 00
SWS	DY-64	POS IONS CUP-7 LEV-8	*	*	3-10	16/744	63	0-15 00
SWS	DY-65	POS IONS-SUM-LEV 9	*	*	3-10	14/744	64	0-13 00
SWS	DW-59	DC HV CAL LEV-9 PROT	*	*	3-10	1/744	64	14 01
SWS	DW-80	AC HV CAL LEV-9 PROT	*	*	3-10	1/744	64	15 01
SWS	DY-66	POS IONS CUP-1 LEV-9	*	*	3-10	16/744	65	0-15 00
SWS	DY-67	POS IONS CUP-2 LEV-9	*	*	3-10	16/744	66	0-15 00
SWS	DY-68	POS IONS CUP-3 LEV-9	*	*	3-10	16/744	67	0-15 00
SWS	DY-69	POS IONS CUP-4 LEV-9	*	*	3-10	16/744	68	0-15 00
SWS	DY-70	POS IONS CUP-5 LEV-9	*	*	3-10	16/744	69	0-15 00
SWS	DY-71	POS IONS CUP-6 LEV-9	*	*	3-10	16/744	70	0-15 00
SWS	DY-72	POS IONS CUP-7 LEV-9	*	*	3-10	16/744	71	0-15 00
SWS	DY-73	POS IONS-SUM-LEV 10	*	*	3-10	14/744	72	0-13 00
SWS	DW-60	DC HV CAL LEV-10 PROT	*	*	3-10	1/744	72	14 01
SWS	DW-81	AC HV CAL LEV-10 PROT	*	*	3-10	1/744	72	15 01
SWS	DY-74	POS IONS CUP-1 LEV-10	*	*	3-10	16/744	73	0-15 00
SWS	DY-75	POS IONS CUP-2 LEV-10	*	*	3-10	16/744	74	0-15 00
SWS	DY-76	POS IONS CUP-3 LEV-10	*	*	3-10	16/744	75	0-15 00
SWS	DY-77	POS IONS CUP-4 LEV-10	*	*	3-10	16/744	76	0-15 00
SWS	DY-78	POS IONS CUP-5 LEV-10	*	*	3-10	16/744	77	0-15 00
SWS	DY-79	POS IONS CUP-6 LEV-10	*	*	3-10	16/744	78	0-15 00
SWS	DY-80	POS IONS CUP-7 LEV-10	*	*	3-10	16/744	79	0-15 00
SWS	DY-81	POS IONS-SUM-LEV 11	*	*	3-10	14/744	80	0-13 00

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD FRM	BITS	S/MF	SWS WD	SWS SEQ	FG BT
SWS	DW-61	DC HV CAL LEV-11 PROT	*	*	3-10	1/744	80	14 01
SWS	DW-82	AC HV CAL LEV-11 PROT	*	*	3-10	1/744	80	15 01
SWS	DY-82	POS IONS CUP-1 LEV-11	*	*	3-10	16/744	81	0-15 00
SWS	DY-83	POS IONS CUP-2 LEV-11	*	*	3-10	16/744	82	0-15 00
SWS	DY-84	POS IONS CUP-3 LEV-11	*	*	3-10	16/744	83	0-15 00
SWS	DY-85	POS IONS CUP-4 LEV-11	*	*	3-10	16/744	84	0-15 00
SWS	DY-86	POS IONS CUP-5 LEV-11	*	*	3-10	16/744	85	0-15 00
SWS	DY-87	POS IONS CUP-6 LEV-11	*	*	3-10	16/744	86	0-15 00
SWS	DY-88	POS IONS CUP-7 LEV-11	*	*	3-10	16/744	87	0-15 00
SWS	DY-89	POS IONS-SUM-LEV 12	*	*	3-10	14/744	88	0-13 00
SWS	DW-62	DC HV CAL LEV-12 PROT	*	*	3-10	1/744	88	14 01
SWS	DW-83	AC HV CAL LEV-12 PROT	*	*	3-10	1/744	88	15 01
SWS	DY-90	POS IONS CUP-1 LEV-12	*	*	3-10	16/744	89	0-15 00
SWS	DY-91	POS IONS CUP-2 LEV-12	*	*	3-10	16/744	90	0-15 00
SWS	DY-92	POS IONS CUP-3 LEV-12	*	*	3-10	16/744	91	0-15 00
SWS	DY-93	POS IONS CUP-4 LEV-12	*	*	3-10	16/744	92	0-15 00
SWS	DY-94	POS IONS CUP-5 LEV-12	*	*	3-10	16/744	93	0-15 00
SWS	DY-95	POS IONS CUP-6 LEV-12	*	*	3-10	16/744	94	0-15 00
SWS	DY-96	POS IONS CUP-7 LEV-12	*	*	3-10	16/744	95	0-15 00
SWS	DZ-1	POS IONS-SUM-LEV 13	*	*	3-10	14/744	96	0-13 00
SWS	DW-63	DC HV CAL LEV-13 PROT	*	*	3-10	1/744	96	14 01
SWS	DW-84	AC HV CAL LEV-13 PROT	*	*	3-10	1/744	96	15 01
SWS	DZ-2	POS IONS CUP-1 LEV-13	*	*	3-10	16/744	97	0-15 00
SWS	DZ-3	POS IONS CUP-2 LEV-13	*	*	3-10	16/744	98	0-15 00
SWS	DZ-4	POS IONS CUP-3 LEV-13	*	*	3-10	16/744	99	0-15 00
SWS	DZ-5	POS IONS CUP-4 LEV-13	*	*	3-10	16/744	100	0-15 00
SWS	DZ-6	POS IONS CUP-5 LEV-13	*	*	3-10	16/744	101	0-15 00
SWS	DZ-7	POS IONS CUP-6 LEV-13	*	*	3-10	16/744	102	0-15 00
SWS	DZ-8	POS IONS CUP-7 LEV-13	*	*	3-10	16/744	103	0-15 00
SWS	DZ-9	POS IONS-SUM-LEV 14	*	*	3-10	14/744	104	0-13 00
SWS	DW-64	DC HV CAL LEV-14 PROT	*	*	3-10	1/744	104	14 01
SWS	DW-85	AC HV CAL LEV-14 PROT	*	*	3-10	1/744	104	15 01
SWS	DZ-10	POS IONS CUP-1 LEV-14	*	*	3-10	16/744	105	0-15 00
SWS	DZ-11	POS IONS CUP-2 LEV-14	*	*	3-10	16/744	106	0-15 00
SWS	DZ-12	POS IONS CUP-3 LEV-14	*	*	3-10	16/744	107	0-15 00

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD FRM	BITS	S/MF	SWS WD	SWS SEQ	FG BT
SWS	DZ-13	POS IONS CUP-4 LEV-14	*	* 3-10	16/744	108	0-15	00
SWS	DZ-14	POS IONS CUP-5 LEV-14	*	* 3-10	16/744	109	0-15	00
SWS	DZ-15	POS IONS CUP-6 LEV-14	*	* 3-10	16/744	110	0-15	00
SWS	DZ-16	POS IONS CUP-7 LEV-14	*	* 3-10	16/744	111	0-15	00
SWS	DW-3	A/D CONVERTER CAL	*	* 3-10	16/744	112	EVN	01
SWS	DW-11	TEMP SENSOR MOD 100	*	* 3-10	8/744	112	ODD	01
SWS	DW-4	A/D CONVERTER CAL	*	* 3-10	8/744	113	EVN	01
SWS	DW-12	TEMP SENSOR MOD 200	*	* 3-10	8/744	113	ODD	01
SWS	DW-5	A/D CONVERTER CAL	*	* 3-10	16/744	114	EVN	01
SWS	DW-13	TEMP SENSOR MOD 300	*	* 3-10	8/744	114	ODD	01
SWS	DW-6	A/D CONVERTER CAL	*	* 3-10	8/744	115	EVN	01
SWS	DW-14	TEMP SENSOR CUP ASSM	*	* 3-10	8/744	115	ODD	01
SWS	DW-7	A/D CONVERTER CAL	*	* 3-10	16/744	116	EVN	01
SWS	DW-15	SUN ANGLE SENSOR	*	* 3-10	8/744	116	ODD	01
SWS	DW-3	A/D CONVERTER CAL	*	* 3-10	16/744	117	EVN	01
SWS	DW-16	PROGRAMMER VOLTAGE	*	* 3-10	8/744	117	ODD	01
SWS	DW-5	A/D CONVERTER CAL	*	* 3-10	16/744	118	EVN	01
SWS	DW-17	STEP GEN VOLTAGE	*	* 3-10	8/744	118	ODD	01
SWS	DW-7	A/D CONVERTER CAL	*	* 3-10	16/744	119	EVN	01
SWS	DW-18	MODULATION MONITOR	*	* 3-10	8/744	119	ODD	01
SWS	DW-19	CURRENT CAL	*	* 3-10	4/744	120	0	01
SWS	DW-27	CURRENT CAL	*	* 3-10	4/744	120	1	01
SWS	DW-35	CURRENT CAL	*	* 3-10	4/744	120	2	01
SWS	DW-43	CURRENT CAL	*	* 3-10	4/744	120	3	01
SWS	DW-19	CURRENT CAL	*	* 3-10	4/744	120	4	01
SWS	DW-27	CURRENT CAL	*	* 3-10	4/744	120	5	01
SWS	DW-35	CURRENT CAL	*	* 3-10	4/744	120	6	01
SWS	DW-43	CURRENT CAL	*	* 3-10	4/744	120	7	01
SWS	DW-19	CURRENT CAL	*	* 3-10	4/744	120	8	01
SWS	DW-27	CURRENT CAL	*	* 3-10	4/744	120	9	01
SWS	DW-35	CURRENT CAL	*	* 3-10	4/744	120	10	01
SWS	DW-43	CURRENT CAL	*	* 3-10	4/744	120	11	01
SWS	DW-19	CURRENT CAL	*	* 3-10	4/744	120	12	01
SWS	DW-27	CURRENT CAL	*	* 3-10	4/744	120	13	01
SWS	DW-35	CURRENT CAL	*	* 3-10	4/744	120	14	01

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD FRM	BITS	S/MF	SWS WD	SWS SEQ	FG BT
SWS	DW-43	CURRENT CAL	*	3-10	4/744	120	15	01
SWS	DW-20	CURRENT CAL	*	3-10	4/744	121	0	01
SWS	DW-28	CURRENT CAL	*	3-10	4/744	121	1	01
SWS	DW-36	CURRENT CAL	*	3-10	4/744	121	2	01
SWS	DW-44	CURRENT CAL	*	3-10	4/744	121	3	01
SWS	DW-20	CURRENT CAL	*	3-10	4/744	121	4	01
SWS	DW-28	CURRENT CAL	*	3-10	4/744	121	5	01
SWS	DW-36	CURRENT CAL	*	3-10	4/744	121	6	01
SWS	DW-44	CURRENT CAL	*	3-10	4/744	121	7	01
SWS	DW-20	CURRENT CAL	*	3-10	4/744	121	8	01
SWS	DW-28	CURRENT CAL	*	3-10	4/744	121	9	01
SWS	DW-36	CURRENT CAL	*	3-10	4/744	121	10	01
SWS	DW-44	CURRENT CAL	*	3-10	4/744	121	11	01
SWS	DW-20	CURRENT CAL	*	3-10	4/744	121	12	01
SWS	DW-28	CURRENT CAL	*	3-10	4/744	121	13	01
SWS	DW-36	CURRENT CAL	*	3-10	4/744	121	14	01
SWS	DW-44	CURRENT CAL	*	3-10	4/744	121	15	01
SWS	DW-21	CURRENT CAL	*	3-10	4/744	122	0	01
SWS	DW-29	CURRENT CAL	*	3-10	4/744	122	1	01
SWS	DW-37	CURRENT CAL	*	3-10	4/744	122	2	01
SWS	DW-45	CURRENT CAL	*	3-10	4/744	122	3	01
SWS	DW-21	CURRENT CAL	*	3-10	4/744	122	4	01
SWS	DW-29	CURRENT CAL	*	3-10	4/744	122	5	01
SWS	DW-37	CURRENT CAL	*	3-10	4/744	122	6	01
SWS	DW-45	CURRENT CAL	*	3-10	4/744	122	7	01
SWS	DW-21	CURRENT CAL	*	3-10	4/744	122	8	01
SWS	DW-29	CURRENT CAL	*	3-10	4/744	122	9	01
SWS	DW-37	CURRENT CAL	*	3-10	4/744	122	10	01
SWS	DW-45	CURRENT CAL	*	3-10	4/744	122	11	01
SWS	DW-21	CURRENT CAL	*	3-10	4/744	122	12	01
SWS	DW-29	CURRENT CAL	*	3-10	4/744	122	13	01
SWS	DW-37	CURRENT CAL	*	3-10	4/744	122	14	01
SWS	DW-45	CURRENT CAL	*	3-10	4/744	122	15	01
SWS	DW-22	CURRENT CAL	*	3-10	4/744	123	0	01
SWS	DW-30	CURRENT CAL	*	3-10	4/744	123	1	01

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD FRM	BITS	S/MF	SWS WD	SWS SEQ	FG BT
SWS	DW-38	CURRENT CAL	*	* 3-10	4/744	123	2	01
SWS	DW-46	CURRENT CAL	*	* 3-10	4/744	123	3	01
SWS	DW-22	CURRENT CAL	*	* 3-10	4/744	123	4	01
SWS	DW-30	CURRENT CAL	*	* 3-10	4/744	123	5	01
SWS	DW-38	CURRENT CAL	*	* 3-10	4/744	123	6	01
SWS	DW-46	CURRENT CAL	*	* 3-10	4/744	123	7	01
SWS	DW-22	CURRENT CAL	*	* 3-10	4/744	123	8	01
SWS	DW-30	CURRENT CAL	*	* 3-10	4/744	123	9	01
SWS	DW-38	CURRENT CAL	*	* 3-10	4/744	123	10	01
SWS	DW-46	CURRENT CAL	*	* 3-10	4/744	123	11	01
SWS	DW-22	CURRENT CAL	*	* 3-10	4/744	123	12	01
SWS	DW-30	CURRENT CAL	*	* 3-10	4/744	123	13	01
SWS	DW-38	CURRENT CAL	*	* 3-10	4/744	123	14	01
SWS	DW-46	CURRENT CAL	*	* 3-10	4/744	123	15	01
SWS	DW-23	CURRENT CAL	*	* 3-10	4/744	124	0	01
SWS	DW-31	CURRENT CAL	*	* 3-10	4/744	124	1	01
SWS	DW-39	CURRENT CAL	*	* 3-10	4/744	124	2	01
SWS	DW-47	CURRENT CAL	*	* 3-10	4/744	124	3	01
SWS	DW-23	CURRENT CAL	*	* 3-10	4/744	124	4	01
SWS	DW-31	CURRENT CAL	*	* 3-10	4/744	124	5	01
SWS	DW-39	CURRENT CAL	*	* 3-10	4/744	124	6	01
SWS	DW-47	CURRENT CAL	*	* 3-10	4/744	124	7	01
SWS	DW-23	CURRENT CAL	*	* 3-10	4/744	124	8	01
SWS	DW-31	CURRENT CAL	*	* 3-10	4/744	124	9	01
SWS	DW-39	CURRENT CAL	*	* 3-10	4/744	124	10	01
SWS	DW-47	CURRENT CAL	*	* 3-10	4/744	124	11	01
SWS	DW-23	CURRENT CAL	*	* 3-10	4/744	124	12	01
SWS	DW-31	CURRENT CAL	*	* 3-10	4/744	124	13	01
SWS	DW-39	CURRENT CAL	*	* 3-10	4/744	124	14	01
SWS	DW-47	CURRENT CAL	*	* 3-10	4/744	124	15	01
SWS	DW-24	CURRENT CAL	*	* 3-10	4/744	125	0	01
SWS	DW-32	CURRENT CAL	*	* 3-10	4/744	125	1	01
SWS	DW-40	CURRENT CAL	*	* 3-10	4/744	125	2	01
SWS	DW-48	CURRENT CAL	*	* 3-10	4/744	125	3	01
SWS	DW-24	CURRENT CAL	*	* 3-10	4/744	125	4	01

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD FRM	BITS	S/MF	SWS WD	SWS SEQ	FG BT
SWS	DW-32	CURRENT CAL	*	3-10	4/744	125	5	01
SWS	DW-40	CURRENT CAL	*	3-10	4/744	125	6	01
SWS	DW-48	CURRENT CAL	*	3-10	4/744	125	7	01
SWS	DW-24	CURRENT CAL	*	3-10	4/744	125	8	01
SWS	DW-32	CURRENT CAL	*	3-10	4/744	125	9	01
SWS	DW-40	CURRENT CAL	*	3-10	4/744	125	10	01
SWS	DW-48	CURRENT CAL	*	3-10	4/744	125	11	01
SWS	DW-24	CURRENT CAL	*	3-10	4/744	125	12	01
SWS	DW-32	CURRENT CAL	*	3-10	4/744	125	13	01
SWS	DW-40	CURRENT CAL	*	3-10	4/744	125	14	01
SWS	DW-48	CURRENT CAL	*	3-10	4/744	125	15	01
SWS	DW-25	CURRENT CAL	*	3-10	4/744	126	0	01
SWS	DW-33	CURRENT CAL	*	3-10	4/744	126	1	01
SWS	DW-41	CURRENT CAL	*	3-10	4/744	126	2	01
SWS	DW-49	CURRENT CAL	*	3-10	4/744	126	3	01
SWS	DW-25	CURRENT CAL	*	3-10	4/744	126	4	01
SWS	DW-33	CURRENT CAL	*	3-10	4/744	126	5	01
SWS	DW-41	CURRENT CAL	*	3-10	4/744	126	6	01
SWS	DW-49	CURRENT CAL	*	3-10	4/744	126	7	01
SWS	DW-25	CURRENT CAL	*	3-10	4/744	126	8	01
SWS	DW-33	CURRENT CAL	*	3-10	4/744	126	9	01
SWS	DW-41	CURRENT CAL	*	3-10	4/744	126	10	01
SWS	DW-49	CURRENT CAL	*	3-10	4/744	126	11	01
SWS	DW-25	CURRENT CAL	*	3-10	4/744	126	12	01
SWS	DW-33	CURRENT CAL	*	3-10	4/744	126	13	01
SWS	DW-41	CURRENT CAL	*	3-10	4/744	126	14	01
SWS	DW-49	CURRENT CAL	*	3-10	4/744	126	15	01
SWS	DW-26	CURRENT CAL	*	3-10	4/744	127	0	01
SWS	DW-34	CURRENT CAL	*	3-10	4/744	127	1	01
SWS	DW-42	CURRENT CAL	*	3-10	4/744	127	2	01
SWS	DW-50	CURRENT CAL	*	3-10	4/744	127	3	01
SWS	DW-26	CURRENT CAL	*	3-10	4/744	127	4	01
SWS	DW-34	CURRENT CAL	*	3-10	4/744	127	5	01
SWS	DW-42	CURRENT CAL	*	3-10	4/744	127	6	01
SWS	DW-50	CURRENT CAL	*	3-10	4/744	127	7	01

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD FRM	BITS	S/MF	SWS WD	SWS SEQ	FG BT
SWS	DW-26	CURRENT CAL	*	3-10	4/744	127	8	01
SWS	DW-34	CURRENT CAL	*	3-10	4/744	127	9	01
SWS	DW-42	CURRENT CAL	*	3-10	4/744	127	10	01
SWS	DW-50	CURRENT CAL	*	3-10	4/744	127	11	01
SWS	DW-26	CURRENT CAL	*	3-10	4/744	127	12	01
SWS	DW-34	CURRENT CAL	*	3-10	4/744	127	13	01
SWS	DW-42	CURRENT CAL	*	3-10	4/744	127	14	01
SWS	DW-50	CURRENT CAL	*	3-10	4/744	127	15	01
SWS	DZ-17	ELEC-SUM-LEV-15	*	3-10	14/744	128	0-13	00
SWS	DW-65	DC HV CAL LEV-1 ELEC	*	3-10	1/744	128	14	01
SWS	DW-86	AC HV CAL LEV-1 ELEC	*	3-10	1/744	128	15	01
SWS	DZ-18	ELEC-CUP-1-LEV-15	*	3-10	16/744	129	0-15	00
SWS	DZ-19	ELEC-CUP-2-LEV-15	*	3-10	16/744	130	0-15	00
SWS	DZ-20	ELEC-CUP-3-LEV-15	*	3-10	16/744	131	0-15	00
SWS	DZ-21	ELEC-CUP-4-LEV-15	*	3-10	16/744	132	0-15	00
SWS	DZ-22	ELEC-CUP-5-LEV-15	*	3-10	16/744	133	0-15	00
SWS	DZ-23	ELEC-CUP-6-LEV-15	*	3-10	16/744	134	0-15	00
SWS	DZ-24	ELEC-CUP-7-LEV-15	*	3-10	16/744	135	0-15	00
SWS	DZ-25	ELEC-SUM-LEV-16	*	3-10	14/744	136	0-13	00
SWS	DW-66	DC HV CAL LEV-2 ELEC	*	3-10	1/744	136	14	01
SWS	DW-87	AC HV CAL LEV-2 ELEC	*	3-10	1/744	136	15	01
SWS	DZ-26	ELEC-CUP-1-LEV-16	*	3-10	16/744	137	0-15	00
SWS	DZ-27	ELEC-CUP-2-LEV-16	*	3-10	16/744	138	0-15	00
SWS	DZ-28	ELEC-CUP-3-LEV-16	*	3-10	16/744	139	0-15	00
SWS	DZ-29	ELEC-CUP-4-LEV-16	*	3-10	16/744	140	0-15	00
SWS	DZ-30	ELEC-CUP-5-LEV-16	*	3-10	16/744	141	0-15	00
SWS	DZ-31	ELEC-CUP-6-LEV-16	*	3-10	16/744	142	0-15	00
SWS	DZ-32	ELEC-CUP-7-LEV-16	*	3-10	16/744	143	0-15	00
SWS	DZ-33	ELEC-SUM-LEV-17	*	3-10	14/744	144	0-13	00
SWS	DW-67	DC HV CAL LEV-3 ELEC	*	3-10	1/744	144	14	01
SWS	DW-88	AC HV CAL LEV-3 ELEC	*	3-10	1/744	144	15	01
SWS	DZ-34	ELEC-CUP-1-LEV-17	*	3-10	16/744	145	0-15	00
SWS	DZ-35	ELEC-CUP-2-LEV-17	*	3-10	16/744	146	0-15	00
SWS	DZ-36	ELEC-CUP-3-LEV-17	*	3-10	16/744	147	0-15	00
SWS	DZ-37	ELEC-CUP-4-LEV-17	*	3-10	16/744	148	0-15	00

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD	FRM	BITS	S/MF	SWS WD	SWS SEQ	FG BT
SWS	DZ-38	ELEC-CUP-5-LEV-17	*	*	3-10	16/744	149	0-15	00
SWS	DZ-39	ELEC-CUP-6-LEV-17	*	*	3-10	16/744	150	0-15	00
SWS	DZ-40	ELEC-CUP-7-LEV-17	*	*	3-10	16/744	151	0-15	00
SWS	DZ-41	ELEC-SUM-LEV-18	*	*	3-10	14/744	152	0-13	00
SWS	DW-68	DC HV CAL LEV-4 ELEC	*	*	3-10	1/744	152	14	01
SWS	DW-89	AC HV CAL LEV-4 ELEC	*	*	3-10	1/744	152	15	01
SWS	DZ-42	ELEC-CUP-1 LEV-18	*	*	3-10	16/744	153	0-15	00
SWS	DZ-43	ELEC-CUP-2 LEV-18	*	*	3-10	16/744	154	0-15	00
SWS	DZ-44	ELEC-CUP-3 LEV-18	*	*	3-10	16/744	155	0-15	00
SWS	DZ-45	ELEC-CUP-4 LEV-18	*	*	3-10	16/744	156	0-15	00
SWS	DZ-46	ELEC-CUP-5 LEV-18	*	*	3-10	16/744	157	0-15	00
SWS	DZ-47	ELEC-CUP-6 LEV-18	*	*	3-10	16/744	158	0-15	00
SWS	DZ-48	ELEC-CUP-7 LEV-18	*	*	3-10	16/744	159	0-15	00
SWS	DZ-49	ELEC-SUM-LEV-19	*	*	3-10	14/744	160	0-13	00
SWS	DW-69	DC HV CAL LEV-5 ELEC	*	*	3-10	1/744	160	14	01
SWS	DW-90	AC HV CAL LEV-5 ELEC	*	*	3-10	1/744	160	15	01
SWS	DZ-50	ELEC-CUP-1-LEV-19	*	*	3-10	16/744	161	0-15	00
SWS	DZ-51	ELEC-CUP-2-LEV-19	*	*	3-10	16/744	162	0-15	00
SWS	DZ-52	ELEC-CUP-3-LEV-19	*	*	3-10	16/744	163	0-15	00
SWS	DZ-53	ELEC-CUP-4-LEV-19	*	*	3-10	16/744	164	0-15	00
SWS	DZ-54	ELEC-CUP-5-LEV-19	*	*	3-10	16/744	165	0-15	00
SWS	DZ-55	ELEC-CUP-6-LEV-19	*	*	3-10	16/744	166	0-15	00
SWS	DZ-56	ELEC-CUP-7-LEV-19	*	*	3-10	16/744	167	0-15	00
SWS	DZ-57	ELEC-SUM-LEV-20	*	*	3-10	14/744	168	0-13	00
SWS	DW-70	DC HV CAL LEV-6 ELEC	*	*	3-10	1/744	168	14	01
SWS	DW-91	AC HV CAL LEV-6 ELEC	*	*	3-10	1/744	168	15	01
SWS	DZ-58	ELEC-CUP-1-LEV-20	*	*	3-10	16/744	169	0-15	00
SWS	DZ-59	ELEC-CUP-2-LEV-20	*	*	3-10	16/744	170	0-15	00
SWS	DZ-60	ELEC-CUP-3-LEV-20	*	*	3-10	16/744	171	0-15	00
SWS	DZ-61	ELEC-CUP-4-LEV-20	*	*	3-10	16/744	172	0-15	00
SWS	DZ-62	ELEC-CUP-5-LEV-20	*	*	3-10	16/744	173	0-15	00
SWS	DZ-63	ELEC-CUP-6-LEV-20	*	*	3-10	16/744	174	0-15	00
SWS	DZ-64	ELEC-CUP-7-LEV-20	*	*	3-10	16/744	175	0-15	00
SWS	DZ-65	ELEC-SUM-LEV-21	*	*	3-10	14/744	176	0-13	00
SWS	DW-71	DC HV CAL LEV-7 ELEC	*	*	3-10	1/744	176	14	01
SWS	DW-92	AC HV CAL LEV-7 ELEC	*	*	3-10	1/744	176	15	01
SWS	DZ-66	ELEC-CUP-1-LEV-21	*	*	3-10	16/744	177	0-15	00
SWS	DZ-67	ELEC-CUP-2-LEV-21	*	*	3-10	16/744	178	0-15	00
SWS	DZ-68	ELEC-CUP-3-LEV-21	*	*	3-10	16/744	179	0-15	00
SWS	DZ-69	ELEC-CUP-4-LEV-21	*	*	3-10	16/744	180	0-15	00
SWS	DZ-70	ELEC-CUP-5-LEV-21	*	*	3-10	16/744	181	0-15	00
SWS	DZ-71	ELEC-CUP-6-LEV-21	*	*	3-10	16/744	182	0-15	00
SWS	DZ-72	ELEC-CUP-7-LEV-21	*	*	3-10	16/744	183	0-15	00
SWS	DW-1	SEQ CTR 1-BIT/SEQ	*	*	3-10	16/744	184	0-15	10
SWS	DW-2	SEQ CTR 1-BIT/256SEQ	*	*	3-10	16/744	185	0-15	10

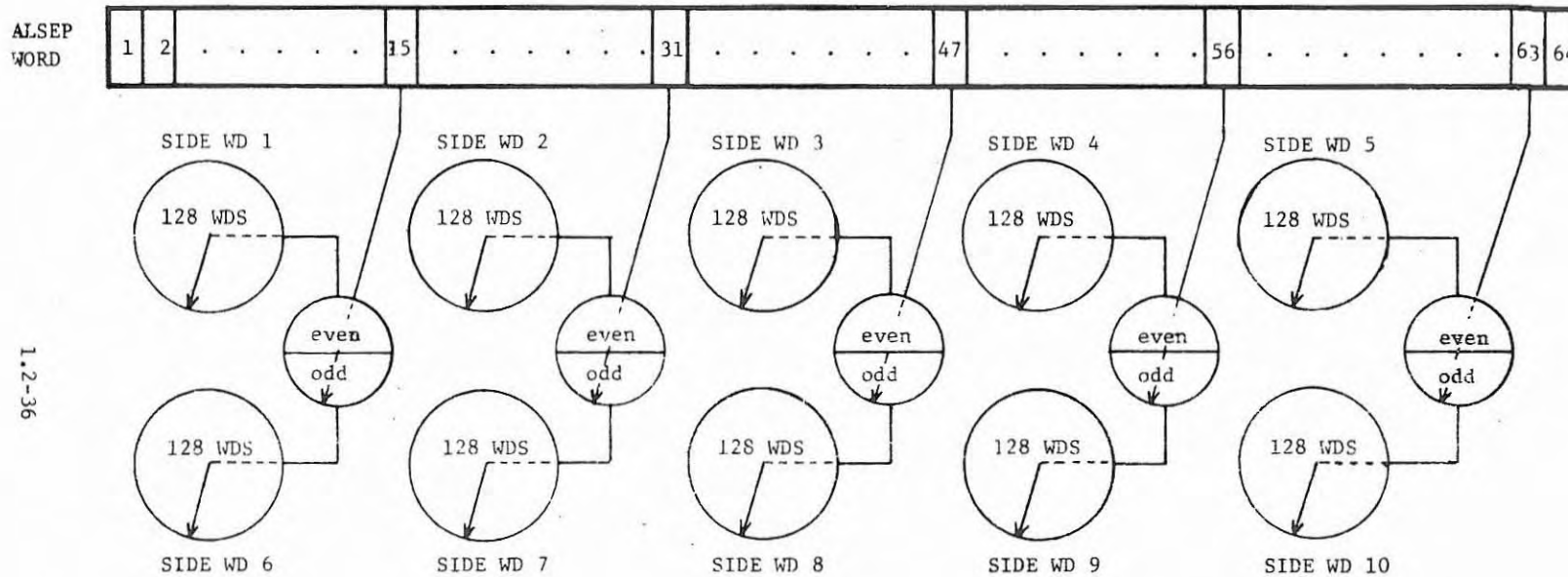
1.2.1.6 Suprathermal Ion Detector and Cold Cathode Gage Experiment (SIDE)

1.2.1.6.1 SIDE Downlink Description

SIDE uses 5 ALSEP main frame words: 15, 31, 47, 56 and 63. Each of the 5 ALSEP words is a two-channel subcommutator, each with a 128-channel sub-subcommutator. The output of the 5 two-channel subcommutator is designated by a SIDE word number of 1 thru 10. These 10 SIDE words constitute a SIDE frame. The SIDE word number that is read out in a particular ALSEP frame is determined by the contents of the LSB of the 90-channel frame counter in ALSEP Word 3. If the LSB is "0", which is EVEN, ALSEP Words 15, 31, 47, 56 and 63 read out SIDE Words 1 thru 5, respectively. If the LSB is "1", which is ODD, ALSEP Words 15, 31, 47, 56 and 63 read out SIDE Words 6 thru 10, respectively. SIDE words 1 and 6 contain bits which also define the ALSEP frame as being EVEN or ODD.

. 10 SIDE WORDS	=	1 SIDE FRAME	=	2 ALSEP MAIN FRAMES
. 128 SIDE FRAMES	=	1 SIDE CYCLE	=	256 ALSEP MAIN FRAMES
. 24 SIDE CYCLES	=	1 SIDE FIELD	=	6144 ALSEP MAIN FRAMES

ALSEP MAIN FRAME



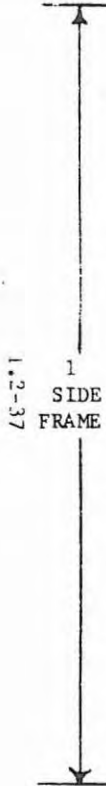
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SIDE SUBCOMMUTATION

SIDE WORD DEFINITIONS

ALSEP		SIDE WORD	CONTENT	MSB										LSB
WORD	FRAME			1	2	3	4	5	6	7	8	9	10	
				9 2*	8 2*	7 2*	6 2	5 2	4 2	3 2	2 2	1 2	0 2	
15	EVEN	1	SIDE FRAME COUNTER	P	F ₁ 0	F ₂ 0	0-127 Frame Count							
31	EVEN	2	HOUSEKEEPING	0	0	30 Digitized Analogs								
47	EVEN	3	HECPA Stepper Voltage	0	0	21 Digitized Analogs								
56	EVEN	4	HED - MSD (Most Significant Data)	10 MSBs of 20 Bit Count						0-999 Decimal				
63	EVEN	5	HED - LSD (Least Significant Data)	10 LSBs of 20 Bit Count						0-999 Decimal				
15	ODD	6	STATUS	P	F ₁ 1	F ₂ 1	9 Digitals							
31	ODD	7	VELOCITY FILTER VOLTAGE	0	0	126 Digitized Analogs								
47	ODD	8	LECPA Stepper Voltage	0	0	7 Digitized Analogs								
56	ODD	9	LED - MSD (Most Significant Data)	10 MSBs of 20 Bit Count						0-999 Decimal				
63	ODD	10	LED - LSD (Least Significant Data)	10 LSBs of 20 Bit Count						0-999 Decimal				



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P = Parity "1" - Odd number of ones in previous ALSEP frame.
 "0" - Even number of ones in previous ALSEP frame.
 F₁ F₂ = ALSEP FRM ID: 00-EVEN, 11-ODD
 * BIT WTs. not applicable when defined.

SIDE COMMANDS

The SIDE has the ability to change its data format by command. There are fifteen operational commands. They are divided into two types, on/off commands and mode commands. Initiation of a mode command changes the operational data format characteristics. Executing any mode or on/off command will eliminate the existing operational mode, whereas execution of mode commands will not affect the status of any on/off commanded functions. The 15 commands are listed on the chart on the following page.

The Command Register, supercommutated in 24 of the SIDE frames in SIDE Word 6, reads out the command awaiting execution by the SIDE. The output configuration is shown on chart. Upon execution of a particular command the register will read out zeros.

The Mode Register is supercommutated in 26 of the SIDE frames in SIDE Word 6. It reads out which of the 14 commands is being performed by the SIDE as shown in the chart. The command that doesn't read out in the Mode Register is Reset Command Register which clears the Command Register.

There are two one time Commands, BREAK CCIG SEAL and BLOW DUST COVER. The status of these is supercommutated in 4 side frames of SIDE Word 6, Dust Cover and Seal. When these commands have been executed zeroes will be read out from then on. A one in this measurement indicates that only the Break Seal command has been executed; a two indicates that only the Blow Dust Cover command has been executed; and a 3 indicates that the one time commands have not been executed.

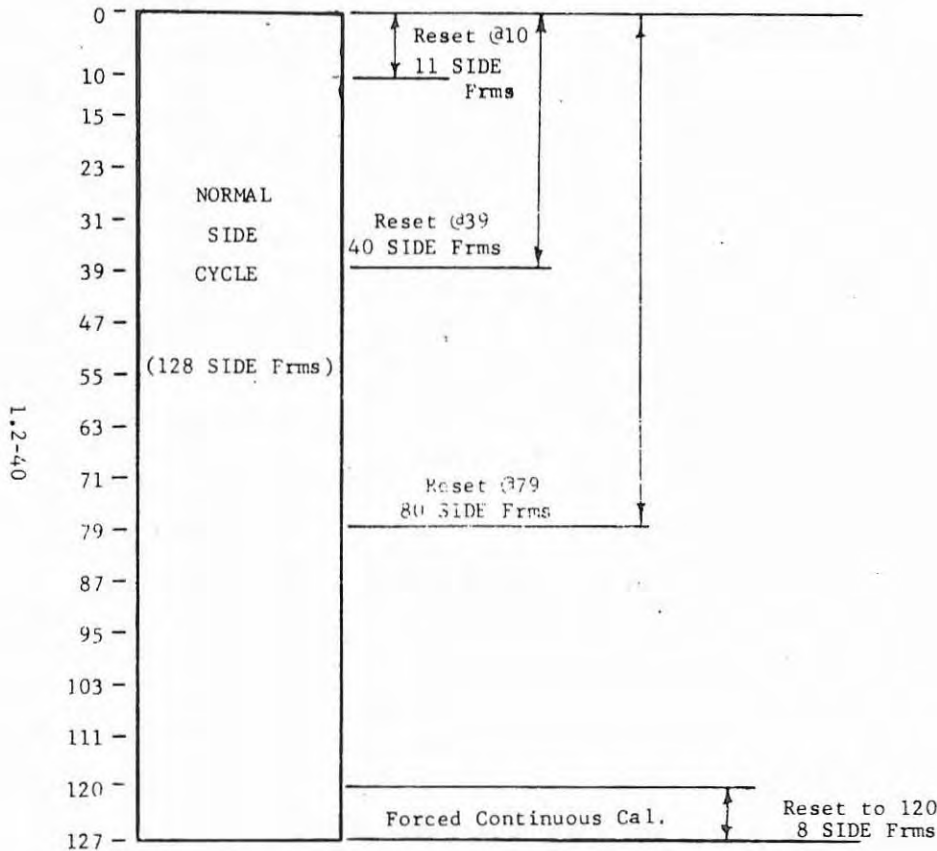
COMMAND OR MODE REGISTER CONTENT - SIDE WORD 6

SIDE CMD No.	COMMAND FUNCTIONS	LSB	9	8	7	6	5	MSB
		10	2 ⁰	2 ¹	2 ²	2 ³	2 ⁴	2 ⁵
1.	Gnd plane step programmer on/off	1	0	0	0	0	0	0
2. *	Reset SIDE frame counter @ 10	0	1	0	0	0	0	0
3. *	Reset SIDE frame counter @ 39	1	1	0	0	0	0	0
4. *	Reset velocity filter @ 9	0	0	1	0	0	0	0
5. *	Reset SIDE frame counter @ 79	1	0	1	0	0	0	0
6. *	Reset SIDE frm ct @ 79 & vel filt @ 9	0	1	1	0	0	0	0
7.	X 10 accumulation interval on/off	1	1	1	0	0	0	0
8. *	Master reset	0	0	0	1	0	0	0
9.	Velocity filter voltage on/off	1	0	0	1	0	0	0
10.	LECPA high voltage on/off	0	1	0	1	0	0	0
11.	HECPA high voltage on/off	1	1	0	1	0	0	0
12. *	Force cont. cal. (Reset to 120)	0	0	1	1	0	0	0
13.	CCIG high voltage on/off	1	0	1	1	0	0	0
14.	Channeltron high voltage on/off	0	1	1	1	0	0	0
15.	Reset command register	1	1	1	1	0	0	0

* - MODE Commands

SIDE WORDS AFFECTED BY SIDE COMMANDS

A. SIDE FRAME COUNTER (SIDE Word 1)



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NORMAL MODE

When the SIDE Experiment power is turned on, the SIDE frame counter resets to 0. It then counts through 127 before resetting to 0, resulting in 128 SIDE frames/SIDE cycle. The frame counter increments by one on the receipt of an even frame pulse.

RESET MODE

Upon command the SIDE frame counter may be operated in reset modes to vary the length of a SIDE cycle.

The SIDE frame counter may be operated in modes: Reset @10, Reset @39, or Reset @79. The command to reset SIDE frame counter @10 causes the frame counter to reset to 0 and then count thru 10 rather than the normal 127 before resetting to 0 again. The SIDE cycle during operation in this mode is 11 frames rather than the normal 128. The SIDE frame counter operates in this mode until a command changes the operational mode. Reset @39 and @79 commands cause the frame counter to operate in a similar manner as reset @10, except counter resets to 0 at frames 39 or 79.

Force Continuous Calibration (Reset to 120) command causes the frame counter to reset to 120. It then counts thru 127 and again resets to 120. It continues counting 120-127 giving continuous calibration data until a command changes the mode.

A. (CONTINUED)

The Master Reset Command will reset the SIDE frame counter to 0 and return the experiment to its normal operational mode.

The execution of an on/off command will reset the SIDE frame counter to 0 and return SIDE to its normal operational mode.

Another command which affects the SIDE frame counter is X10 Accumulation Interval On/Off Command. This command causes each SIDE frame and SIDE frame count to be output 10 times before advancing to the next frame and frame count. The length of the cycle can be varied by mode commands.

B. VELOCITY FILTER VOLTAGE (SIDE WORD 7)

Velocity Filter Voltage consists of 120 different Voltage steps, 20 steps for each of the 6 voltages of the LECPA. Channels 120 - 127 are calibrations. In the normal mode, 126 measurements are readout.

The Velocity Filter Voltage can be commanded to change operational mode. Reset Velocity Filter @ 9 command causes the Velocity Filter to execute only the first 10 of its normal 20 step program. At SIDE frame 10 it assumes the value of SIDE frame 20 in normal mode. At SIDE frame 20 it assumes the normal mode value of SIDE frame 40. This continues like this for the complete 128 frames during normal mode.

C. LOW ENERGY CURVED PLATE ANALYZER (LECPA) VOLTAGE (SIDE WORD 8)

LECPA Voltage consists of 7 measurements, 6 of which are 6 different voltage levels output on a 20 step program. The LECPA maintains its value for 20 frames then steps to the next value. The Seventh measurement is channels 120 - 127, calibration.

Reset Velocity Filter @ 9 command causes LECPA to step to the next value every 10 frames, rather than the normal 20 frames.

1.2.1.6.2 SIDE PARAMETER LISTING

DOWNLINK LISTINGS COLUMN HEADERS

Col.	1	Experiment name.
Col.	2	Measurement number. (An asterisk in col. 11 indicates that the word is subcommand)
Col.	3	Measurement name.
Col.	4	ALSEP main frame (1-64) word. An asterisk in this column indicates that experiment's words are asynchronous with respect to the ALSEP main frame word.
Col.	5	ALSEP frame. The ALSEP frame number as read from the ALSEP frame counter in ALSEP word 3. The ALSEP frame counter counts from 1-89, and then to 0, which represents 90. Columns 46-48 may contain one of the following words: ALL = All ALSEP main frames EVN = Even numbered ALSEP main frames ODD = Odd numbered ALSEP main frames. An asterisk in this column indicates that this parameter is asynchronous with respect to the ALSEP frame.
Col.	6	Bits. Indicates which of the ten bits (1-10) of an ALSEP or experiment word contain the measurement number given in columns 7-11.
Col.	7	Samples per Main Frame (S/MF). Indicates how often (on the average) a parameter appear in the ALSEP main frame.
Col.	8	Experiment word. For the LSM these columns indicate the LSM word number (1-16) For the SIDE these columns indicate the SIDE word number (1-10) For the SWS these columns indicate the SWS word number (0-185)
Col.	9	Experiment Frame. For the SWS these columns indicate the SWS sequence number (0-15) For the SIDE these columns indicate the SIDE frame number (0-127)
Col.	10	Flag bits.

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD FRM	BITS	S/MF	SIDE WD	SIDE FRAME	FG BT
SIDE	DF-7	PARITY	15	EVN	1	128/256	1	0-127
SIDE	DF-8	FRAME ID (00)	15	EVN	2-3	128/256	1	0-127
SIDE	DI-1	SIDE FRM CTR (0-127)	15	EVN	4-10	128/256	1	0-127
SIDE		FILL ZEROS	31	EVN	1-2	128/256	2	0-127
SIDE	DI-2	+5 VOLTS ANALOG	31	EVN	3-10	4/256	2	0
SIDE	DI-3	CCGE OUTPUT	31	EVN	3-10	15/256	2	1
SIDE	DI-4	TEMP-1	31	EVN	3-10	4/256	2	2
SIDE	DI-3	CCGE OUTPUT	31	EVN	3-10	15/256	2	3
SIDE	DI-5	TEMP-2	31	EVN	3-10	4/256	2	4
SIDE	DI-3	CCGE OUTPUT	31	EVN	3-10	15/256	2	5
SIDE	DI-6	TEMP-3	31	EVN	3-10	4/256	2	6
SIDE	DI-3	CCGE OUTPUT	31	EVN	3-10	15/256	2	7
SIDE	DI-7	4.5 KV	31	EVN	3-10	4/256	2	8
SIDE	DI-3	CCGE OUTPUT	31	EVN	3-10	15/256	2	9
SIDE	DI-8	CCGE RANGE	31	EVN	3-10	8/256	2	10
SIDE	DI-9	TEMP-4	31	EVN	3-10	4/256	2	11
SIDE	DI-10	TEMP-5	31	EVN	3-10	4/256	2	12
SIDE	DI-11	GND PLANE VOLTAGE	31	EVN	3-10	15/256	2	13
SIDE	DI-12	SOLAR CELL	31	EVN	3-10	2/256	2	14
SIDE	DI-11	GND PLANE VOLTAGE	31	EVN	3-10	15/256	2	15
SIDE	DI-13	+60 VOLTS	31	EVN	3-10	4/256	2	16
SIDE	DI-14	+30 VOLTS	31	EVN	3-10	4/256	2	17
SIDE	DI-15	+5 VOLTS DIGITAL	31	EVN	3-10	4/256	2	18
SIDE	DI-16	GROUND	31	EVN	3-10	4/256	2	19
SIDE	DI-17	-5 VOLTS	31	EVN	3-10	4/256	2	20
SIDE	DI-18	-30 VOLTS	31	EVN	3-10	4/256	2	21
SIDE	DI-19	TEMP-6	31	EVN	3-10	4/256	2	22
SIDE	DI-20	-3.5 KV	31	EVN	3-10	4/256	2	23
SIDE	DI-8	CCGE RANGE	31	EVN	3-10	8/256	2	24
SIDE	DI-22	+30 MULTIVOLT CAL	31	EVN	3-10	3/256	2	25
SIDE	DI-23	+A/D REF VOLTAGE	31	EVN	3-10	3/256	2	26
SIDE	DI-21	+1.0 VOLT CAL	31	EVN	3-10	3/256	2	27
SIDE	DI-28	+12 VOLT CAL	31	EVN	3-10	3/256	2	28
SIDE	DI-11	GND PLANE VOLTAGE	31	EVN	3-10	15/256	2	29
SIDE	DI-25	-A/D REF VOLT	31	EVN	3-10	3/256	2	30

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD FRM	BITS	S/MF	SIDE WD	SIDE FRAME	FG BT
SIDE	DI-11	GND PLANE VOLTAGE	31	EVN 3-10	15/256	2	31	
SIDE	DI-2	+5 VOLTS ANALOG	31	EVN 3-10	4/256	2	32	
SIDE	DI-29	1-TIME CMD REG STAT	31	EVN 3-10	4/256	2	33	
SIDE	DI-4	TEMP-1	31	EVN 3-10	4/256	2	34	
SIDE	DI-29	1-TIME CMD REG STAT	31	EVN 3-10	4/256	2	35	
SIDE	DI-5	TEMP-2	31	EVN 3-10	4/256	2	36	
SIDE	DI-26	-1.0 VOLT CAL	31	EVN 3-10	2/256	2	37	
SIDE	DI-6	TEMP-3	31	EVN 3-10	4/256	2	38	
SIDE	DI-27	-12 VOLT CAL	31	EVN 3-10	2/256	2	39	
SIDE	DI-7	4.5 KV	31	EVN 3-10	4/256	2	40	
SIDE	DI-3	CCGE OUTPUT	31	EVN 3-10	15/256	2	41	
SIDE	DI-8	CCGE RANGE	31	EVN 3-10	8/256	2	42	
SIDE	DI-9	TEMP-4	31	EVN 3-10	4/256	2	43	
SIDE	DI-10	TEMP-5	31	EVN 3-10	4/256	2	44	
SIDE	DI-11	GND PLANE VOLTAGE	31	EVN 3-10	15/256	2	45	
SIDE	DI-30	-30 MULTIVOLT CAL	31	EVN 3-10	2/256	2	46	
SIDE	DI-11	GND PLANE VOLTAGE	31	EVN 3-10	15/256	2	47	
SIDE	DI-13	+60 VOLTS	31	EVN 3-10	4/256	2	48	
SIDE	DI-14	+30 VOLTS	31	EVN 3-10	4/256	2	49	
SIDE	DI-15	+5 VOLTS DIGITAL	31	EVN 3-10	4/256	2	50	
SIDE	DI-16	GROUND	31	EVN 3-10	4/256	2	51	
SIDE	DI-17	-5 VOLTS	31	EVN 3-10	4/256	2	52	
SIDE	DI-18	-30 VOLTS	31	EVN 3-10	4/256	2	53	
SIDE	DI-19	TEMP-6	31	EVN 3-10	4/256	2	54	
SIDE	DI-20	-3.5 KV	31	EVN 3-10	4/256	2	55	
SIDE	DI-8	CCGE RANGE	31	EVN 3-10	8/256	2	56	
SIDE	DI-22	+30 MULTIVOLT CAL	31	EVN 3-10	3/256	2	57	
SIDE	DI-23	+A/D REF VOLTAGE	31	EVN 3-10	3/256	2	58	
SIDE	DI-21	+1.0 VOLT CAL	31	EVN 3-10	3/256	2	59	
SIDE	DI-28	+12 VOLT CAL	31	EVN 3-10	3/256	2	60	
SIDE	DI-11	GND PLANE VOLTAGE	31	EVN 3-10	15/256	2	61	
SIDE	DI-25	-A/D REF VOLT	31	EVN 3-10	3/256	2	62	
SIDE	DI-11	GND PLANE VOLTAGE	31	EVN 3-10	15/256	2	63	
SIDE	DI-2	+5 VOLTS ANALOG	31	EVN 3-10	4/256	2	64	
SIDE	DI-29	PRG REG DUTY FACTOR	31	EVN 3-10	1/256	2	65	

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EXP NAME	MEAS NO	MEAS NAME	ALSEP WD FRM	BITS	S/MF	SIDE WD	SIDE FRAME	FG BT
SIDE	DI-4	TEMP-1	31	EVN 3-10	4/256	2	66	
SIDE	DI-24	DUST COVER AND SEAL	31	EVN 3-10	2/256	2	67	
SIDE	DI-5	TEMP-2	31	EVN 3-10	4/256	2	68	
SIDE	DI-11	GND PLANE VOLTAGE	31	EVN 3-10	15/256	2	69	
SIDE	DI-6	TEMP-3	31	EVN 3-10	4/256	2	70	
SIDE	DI-24	DUST COVER AND SEAL	31	EVN 3-10	2/256	2	71	
SIDE	DI-7	4.5 KV	31	EVN 3-10	4/256	2	72	
SIDE	DI-3	CCGE OUTPUT	31	EVN 3-10	15/256	2	73	
SIDE	DI-8	CCGE RANGE	31	EVN 3-10	8/256	2	74	
SIDE	DI-9	TEMP-4	31	EVN 3-10	4/256	2	75	
SIDE	DI-10	TEMP-5	31	EVN 3-10	4/256	2	76	
SIDE	DI-11	GND PLANE VOLTAGE	31	EVN 3-10	8/256	2	77	
SIDE	DI-12	SOLAR CELL	31	EVN 3-10	2/256	2	78	
SIDE	DI-11	GND PLANE VOLTAGE	31	EVN 3-10	8/256	2	79	
SIDE	DI-13	+60 VOLTS	31	EVN 3-10	4/256	2	80	
SIDE	DI-14	+30 VOLTS	31	EVN 3-10	4/256	2	81	
SIDE	DI-15	+5 VOLTS DIGITAL	31	EVN 3-10	4/256	2	82	
SIDE	DI-16	GROUND	31	EVN 3-10	4/256	2	83	
SIDE	DI-17	-5 VOLTS	31	EVN 3-10	4/256	2	84	
SIDE	DI-18	-30 VOLTS	31	EVN 3-10	4/256	2	85	
SIDE	DI-19	TEMP-6	31	EVN 3-10	4/256	2	86	
SIDE	DI-20	-3.5 KV	31	EVN 3-10	4/256	2	87	
SIDE	DI-8	CCGE RANGE	31	EVN 3-10	8/256	2	88	
SIDE	DI-22	+30 MULTIVOLT CAL	31	EVN 3-10	3/256	2	89	
SIDE	DI-23	+A/D REF VOLTAGE	31	EVN 3-10	3/256	2	90	
SIDE	DI-21	+1.0 VOLT CAL	31	EVN 3-10	3/256	2	91	
SIDE	DI-28	+12 VOLT CAL	31	EVN 3-10	3/256	2	92	
SIDE	DI-11	GND PLANE VOLTAGE	31	EVN 3-10	8/256	2	93	
SIDE	DI-25	-A/D REF VOLT	31	EVN 3-10	3/256	2	94	
SIDE	DI-11	GND PLANE VOLTAGE	31	EVN 3-10	8/256	2	95	
SIDE	DI-2	+5 VOLTS ANALOG	31	EVN 3-10	4/256	2	96	
SIDE	DI-29	1-TIME CMD REG STAT	31	EVN 3-10	4/256	2	97	
SIDE	DI-4	TEMP-1	31	EVN 3-10	4/256	2	98	
SIDE	DI-29	1-TIME CMD REG STAT	31	EVN 3-10	4/256	2	99	
SIDE	DI-5	TEMP-2	31	EVN 3-10	4/256	2	100	

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD FRM	BITS	S/MF	SIDE WD	SIDE FRAME	FG BT
SIDE	D1-26	-1.0 VOLT CAL	31	EVN 3-10	2/256	2	101	
SIDE	D1-6	TEMP-3	31	EVN 3-10	4/256	2	102	
SIDE	D1-27	-12 VOLT CAL	31	EVN 3-10	2/256	2	103	
SIDE	D1-7	4.5 KV	31	EVN 3-10	4/256	2	104	
SIDE	D1-3	CCGE OUTPUT	31	EVN 3-10	15/256	2	105	
SIDE	D1-8	CCGE RANGE	31	EVN 3-10	8/256	2	106	
SIDE	D1-9	TEMP-4	31	EVN 3-10	4/256	2	107	
SIDE	D1-10	TEMP-5	31	EVN 3-10	4/256	2	108	
SIDE	D1-11	GND PLANE VOLTAGE	31	EVN 3-10	8/256	2	109	
SIDE	D1-30	-30 MULTIVOLT CAL	31	EVN 3-10	2/256	2	110	
SIDE	D1-11	GND PLANE VOLTAGE	31	EVN 3-10	8/256	2	111	
SIDE	D1-13	+60 VOLTS	31	EVN 3-10	4/256	2	112	
SIDE	D1-14	+30 VOLTS	31	EVN 3-10	4/256	2	113	
SIDE	D1-15	+5 VOLTS DIGITAL	31	EVN 3-10	4/256	2	114	
SIDE	D1-16	GROUND	31	EVN 3-10	4/256	2	115	
SIDE	D1-17	-5 VOLTS	31	EVN 3-10	4/256	2	116	
SIDE	D1-18	-30 VOLTS	31	EVN 3-10	4/256	2	117	
SIDE	D1-19	TEMP-6	31	EVN 3-10	4/256	2	118	
SIDE	D1-20	-3.5 KV	31	EVN 3-10	4/256	2	119	
SIDE	D1-8	CCGE RANGE	31	EVN 3-10	8/256	2	120	
SIDE	D1-3	CCGE OUTPUT	31	EVN 3-10	15/256	2	121	
SIDE	D1-3	CCGE OUTPUT	31	EVN 3-10	15/256	2	122	
SIDE	D1-3	CCGE OUTPUT	31	EVN 3-10	15/256	2	123	
SIDE	D1-3	CCGE OUTPUT	31	EVN 3-10	15/256	2	124	
SIDE	D1-3	CCGE OUTPUT	31	EVN 3-10	15/256	2	125	
SIDE	D1-3	CCGE OUTPUT	31	EVN 3-10	15/256	2	126	
SIDE	D1-3	CCGE OUTPUT	31	EVN 3-10	15/256	2	127	
SIDE		FILL ZEROS	47	EVN 1-2	128/256	3	U-127	
SIDE	D1-50	HECPA STEP VOLTAGE	47	EVN 3-10	8/256	3	0	
SIDE	D1-40	HECPA STEP VOLTAGE	47	EVN 3-10	6/256	3	1	
SIDE	D1-41	HECPA STEP VOLTAGE	47	EVN 3-10	6/256	3	2	
SIDE	D1-42	HECPA STEP VOLTAGE	47	EVN 3-10	6/256	3	3	
SIDE	D1-43	HECPA STEP VOLTAGE	47	EVN 3-10	6/256	3	4	
SIDE	D1-44	HECPA STEP VOLTAGE	47	EVN 3-10	6/256	3	5	
SIDE	D1-45	HECPA STEP VOLTAGE	47	EVN 3-10	6/256	3	6	

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD	FRM	BITS	S/MF	SIDE WD	SIDE FRAME	FG BT
SIDE	DI-46	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		7
SIDE	DI-47	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		8
SIDE	DI-48	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		9
SIDE	DI-49	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		10
SIDE	DI-50	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		11
SIDE	DI-51	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		12
SIDE	DI-52	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		13
SIDE	DI-53	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		14
SIDE	DI-54	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		15
SIDE	DI-55	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		16
SIDE	DI-56	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		17
SIDE	DI-57	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		18
SIDE	DI-58	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		19
SIDE	DI-59	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		20
SIDE	DI-40	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		21
SIDE	DI-41	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		22
SIDE	DI-42	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		23
SIDE	DI-43	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		24
SIDE	DI-44	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		25
SIDE	DI-45	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		26
SIDE	DI-46	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		27
SIDE	DI-47	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		28
SIDE	DI-48	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		29
SIDE	DI-49	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		30
SIDE	DI-50	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		31
SIDE	DI-51	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		32
SIDE	DI-52	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		33
SIDE	DI-53	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		34
SIDE	DI-54	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		35
SIDE	DI-55	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		36
SIDE	DI-56	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		37
SIDE	DI-57	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		38
SIDE	DI-58	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		39
SIDE	DI-59	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		40
SIDE	DI-40	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		41

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EXP NAME	MLAS NO	MEAS NAME	ALSEP WD FRM	BITS	S/MF	SIDE WD	SIDE FRAME	FG BT
SIDE	DI-41	HECPA STEP VOLTAGE	47	EVN 3-10	6/256	3	42	
SIDE	DI-42	HECPA STEP VOLTAGE	47	EVN 3-10	6/256	3	43	
SIDE	DI-43	HECPA STEP VOLTAGE	47	EVN 3-10	6/256	3	44	
SIDE	DI-44	HECPA STEP VOLTAGE	47	EVN 3-10	6/256	3	45	
SIDE	DI-45	HECPA STEP VOLTAGE	47	EVN 3-10	6/256	3	46	
SIDE	DI-46	HECPA STEP VOLTAGE	47	EVN 3-10	6/256	3	47	
SIDE	DI-47	HECPA STEP VOLTAGE	47	EVN 3-10	6/256	3	48	
SIDE	DI-48	HECPA STEP VOLTAGE	47	EVN 3-10	6/256	3	49	
SIDE	DI-49	HECPA STEP VOLTAGE	47	EVN 3-10	6/256	3	50	
SIDE	DI-50	HECPA STEP VOLTAGE	47	EVN 3-10	6/256	3	51	
SIDE	DI-51	HECPA STEP VOLTAGE	47	EVN 3-10	6/256	3	52	
SIDE	DI-52	HECPA STEP VOLTAGE	47	EVN 3-10	6/256	3	53	
SIDE	DI-53	HECPA STEP VOLTAGE	47	EVN 3-10	6/256	3	54	
SIDE	DI-54	HECPA STEP VOLTAGE	47	EVN 3-10	6/256	3	55	
SIDE	DI-55	HECPA STEP VOLTAGE	47	EVN 3-10	6/256	3	56	
SIDE	DI-56	HECPA STEP VOLTAGE	47	EVN 3-10	6/256	3	57	
SIDE	DI-57	HECPA STEP VOLTAGE	47	EVN 3-10	6/256	3	58	
SIDE	DI-58	HECPA STEP VOLTAGE	47	EVN 3-10	6/256	3	59	
SIDE	DI-59	HECPA STEP VOLTAGE	47	EVN 3-10	6/256	3	60	
SIDE	DI-40	HECPA STEP VOLTAGE	47	EVN 3-10	6/256	3	61	
SIDE	DI-41	HECPA STEP VOLTAGE	47	EVN 3-10	6/256	3	62	
SIDE	DI-42	HECPA STEP VOLTAGE	47	EVN 3-10	6/256	3	63	
SIDE	DI-43	HECPA STEP VOLTAGE	47	EVN 3-10	6/256	3	64	
SIDE	DI-44	HECPA STEP VOLTAGE	47	EVN 3-10	6/256	3	65	
SIDE	DI-45	HECPA STEP VOLTAGE	47	EVN 3-10	6/256	3	66	
SIDE	DI-46	HECPA STEP VOLTAGE	47	EVN 3-10	6/256	3	67	
SIDE	DI-47	HECPA STEP VOLTAGE	47	EVN 3-10	6/256	3	68	
SIDE	DI-48	HECPA STEP VOLTAGE	47	EVN 3-10	6/256	3	69	
SIDE	DI-49	HECPA STEP VOLTAGE	47	EVN 3-10	6/256	3	70	
SIDE	DI-50	HECPA STEP VOLTAGE	47	EVN 3-10	6/256	3	71	
SIDE	DI-51	HECPA STEP VOLTAGE	47	EVN 3-10	6/256	3	72	
SIDE	DI-52	HECPA STEP VOLTAGE	47	EVN 3-10	6/256	3	73	
SIDE	DI-53	HECPA STEP VOLTAGE	47	EVN 3-10	6/256	3	74	
SIDE	DI-54	HECPA STEP VOLTAGE	47	EVN 3-10	6/256	3	75	
SIDE	DI-55	HECPA STEP VOLTAGE	47	EVN 3-10	6/256	3	76	

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EXP NAME	MEAS NO	MEAS NAME	ALSEP WD FRM BITS	S/MF	SIDE WD	SIDE FRAME	FG BT
SIDE	DI-56	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		77
SIDE	DI-57	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		78
SIDE	DI-58	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		79
SIDE	DI-59	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		80
SIDE	DI-40	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		81
SIDE	DI-41	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		82
SIDE	DI-42	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		83
SIDE	DI-43	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		84
SIDE	DI-44	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		85
SIDE	DI-45	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		86
SIDE	DI-46	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		87
SIDE	DI-47	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		88
SIDE	DI-48	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		89
SIDE	DI-49	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		90
SIDE	DI-50	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		91
SIDE	DI-51	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		92
SIDE	DI-52	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		93
SIDE	DI-53	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		94
SIDE	DI-54	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		95
SIDE	DI-55	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		96
SIDE	DI-56	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		97
SIDE	DI-57	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		98
SIDE	DI-58	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		99
SIDE	DI-59	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		100
SIDE	DI-40	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		101
SIDE	DI-41	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		102
SIDE	DI-42	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		103
SIDE	DI-43	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		104
SIDE	DI-44	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		105
SIDE	DI-45	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		106
SIDE	DI-46	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		107
SIDE	DI-47	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		108
SIDE	DI-48	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		109
SIDE	DI-49	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		110
SIDE	DI-50	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		111

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD FRM	BITS	S/MF	SIDE WD	SIDE FRAME	FG BT
SIDE	DI-51	HECPA STEP VOLTAGE	47	EVN 3-10	6/256	3	112	
SIDE	DI-52	HECPA STEP VOLTAGE	47	EVN 3-10	6/256	3	113	
SIDE	DI-53	HECPA STEP VOLTAGE	47	EVN 3-10	6/256	3	114	
SIDE	DI-54	HECPA STEP VOLTAGE	47	EVN 3-10	6/256	3	115	
SIDE	DI-55	HECPA STEP VOLTAGE	47	EVN 3-10	6/256	3	116	
SIDE	DI-56	HECPA STEP VOLTAGE	47	EVN 3-10	6/256	3	117	
SIDE	DI-57	HECPA STEP VOLTAGE	47	EVN 3-10	6/256	3	118	
SIDE	DI-58	HECPA STEP VOLTAGE	47	EVN 3-10	6/256	3	119	
SIDE	DI-59	HECPA STEP VOLTAGE	47	EVN 3-10	6/256	3	120	
SIDE	DI-60	HECPA STEP VOLTAGE	47	EVN 3-10	8/256	3	121	
SIDE	DI-60	HECPA STEP VOLTAGE	47	EVN 3-10	8/256	3	122	
SIDE	DI-60	HECPA STEP VOLTAGE	47	EVN 3-10	8/256	3	123	
SIDE	DI-60	HECPA STEP VOLTAGE	47	EVN 3-10	8/256	3	124	
SIDE	DI-60	HECPA STEP VOLTAGE	47	EVN 3-10	8/256	3	125	
SIDE	DI-60	HECPA STEP VOLTAGE	47	EVN 3-10	8/256	3	126	
SIDE	DI-60	HECPA STEP VOLTAGE	47	EVN 3-10	8/256	3	127	
SIDE	DI-61	HE DATA - MSD	56	EVN 1-10	128/256	4	0-127	
SIDE	DI-62	HE DATA - LSD	63	EVN 1-10	128/256	5	0-127	
SIDE	DF-7	PARITY	15	ODD 1	128/256	6	0-127	
SIDE	DF-8	FRAME ID (11)	15	ODD 2-3	128/256	6	0-127	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD 4-10	60/256	6	0	
SIDE	DI-64	COMMAND REGISTER	15	ODD 4-10	24/256	6	1	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD 4-10	60/256	6	2	
SIDE	DI-65	MODE REGISTER	15	ODD 4-10	26/256	6	3	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD 4-10	60/256	6	4	
SIDE	DI-64	COMMAND REGISTER	15	ODD 4-10	24/256	6	5	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD 4-10	60/256	6	6	
SIDE	DI-66	DUST COVER AND SEAL	15	ODD 4-10	4/256	6	7	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD 4-10	60/256	6	8	
SIDE	DI-67	ELECTROMETER RANGE	15	ODD 4-10	7/256	6	9	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD 4-10	60/256	6	10	
SIDE	DI-65	MODE REGISTER	15	ODD 4-10	26/256	6	11	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD 4-10	60/256	6	12	
SIDE	DI-64	COMMAND REGISTER	15	ODD 4-10	24/256	6	13	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD 4-10	60/256	6	14	

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD	FRM	BITS	S/MF	SIDE WD	SIDE FRAME	FG BT
SIDE	DI-65	MODE REGISTER	15	ODD	4-10	26/256	6	15	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	16	
SIDE	DI-64	COMMAND REGISTER	15	ODD	4-10	24/256	6	17	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	18	
SIDE	DI-65	MODE REGISTER	15	ODD	4-10	26/256	6	19	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	20	
SIDE	DI-64	COMMAND REGISTER	15	ODD	4-10	24/256	6	21	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	22	
SIDE	DI-65	MODE REGISTER	15	ODD	4-10	26/256	6	23	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	24	
SIDE	DI-67	ELECTROMETER RANGE	15	ODD	4-10	7/256	6	25	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	26	
SIDE	DI-65	MODE REGISTER	15	ODD	4-10	26/256	6	27	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	28	
SIDE	DI-64	COMMAND REGISTER	15	ODD	4-10	24/256	6	29	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	30	
SIDE	DI-65	MODE REGISTER	15	ODD	4-10	26/256	6	31	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	32	
SIDE	DI-64	COMMAND REGISTER	15	ODD	4-10	24/256	6	33	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	34	
SIDE	DI-65	MODE REGISTER	15	ODD	4-10	26/256	6	35	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	36	
SIDE	DI-64	COMMAND REGISTER	15	ODD	4-10	24/256	6	37	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	38	
SIDE	DI-66	DUST COVER AND SEAL	15	ODD	4-10	4/256	6	39	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	40	
SIDE	DI-67	ELECTROMETER RANGE	15	ODD	4-10	7/256	6	41	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	42	
SIDE	DI-65	MODE REGISTER	15	ODD	4-10	26/256	6	43	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	44	
SIDE	DI-64	COMMAND REGISTER	15	ODD	4-10	24/256	6	45	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	46	
SIDE	DI-65	MODE REGISTER	15	ODD	4-10	26/256	6	47	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	48	
SIDE	DI-64	COMMAND REGISTER	15	ODD	4-10	24/256	6	49	

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD FRM	BITS	S/MF	SIDE WD	SIDE FRAME	FG BT
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	50
SIDE	DI-65	MODE REGISTER	15	ODD	4-10	26/256	6	51
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	52
SIDE	DI-64	COMMAND REGISTER	15	ODD	4-10	24/256	6	53
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	54
SIDE	DI-65	MODE REGISTER	15	ODD	4-10	26/256	6	55
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	56
SIDE	DI-67	ELECTROMETER RANGE	15	ODD	4-10	7/256	6	57
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	58
SIDE	DI-65	MODE REGISTER	15	ODD	4-10	26/256	6	59
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	60
SIDE	DI-64	COMMAND REGISTER	15	ODD	4-10	24/256	6	61
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	62
SIDE	DI-65	MODE REGISTER	15	ODD	4-10	26/256	6	63
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	64
SIDE	DI-64	COMMAND REGISTER	15	ODD	4-10	24/256	6	65
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	66
SIDE	DI-65	MODE REGISTER	15	ODD	4-10	26/256	6	67
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	68
SIDE	DI-64	COMMAND REGISTER	15	ODD	4-10	24/256	6	69
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	70
SIDE	DI-66	DUST COVER AND SEAL	15	ODD	4-10	4/256	6	71
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	72
SIDE	DI-67	ELECTROMETER RANGE	15	ODD	4-10	7/256	6	73
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	74
SIDE	DI-65	MODE REGISTER	15	ODD	4-10	26/256	6	75
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	76
SIDE	DI-64	COMMAND REGISTER	15	ODD	4-10	24/256	6	77
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	78
SIDE	DI-65	MODE REGISTER	15	ODD	4-10	26/256	6	79
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	80
SIDE	DI-64	COMMAND REGISTER	15	ODD	4-10	24/256	6	81
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	82
SIDE	DI-65	MODE REGISTER	15	ODD	4-10	26/256	6	83
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	84

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD FRM	BITS	S/MF	SIDE WD	SIDE FRAME	FG BT
SIDE	DI-64	COMMAND REGISTER	15	ODD	4-10	24/256	6	85
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	86
SIDE	DI-65	MODE REGISTER	15	ODD	4-10	26/256	6	87
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	88
SIDE	DI-67	ELECTROMETER RANGE	15	ODD	4-10	7/256	6	89
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	90
SIDE	DI-65	MODE REGISTER	15	ODD	4-10	26/256	6	91
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	92
SIDE	DI-64	COMMAND REGISTER	15	ODD	4-10	24/256	6	93
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	94
SIDE	DI-65	MODE REGISTER	15	ODD	4-10	26/256	6	95
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	96
SIDE	DI-64	COMMAND REGISTER	15	ODD	4-10	24/256	6	97
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	98
SIDE	DI-65	MODE REGISTER	15	ODD	4-10	26/256	6	99
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	100
SIDE	DI-64	COMMAND REGISTER	15	ODD	4-10	24/256	6	101
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	102
SIDE	DI-66	DUST COVER AND SEAL	15	ODD	4-10	4/256	6	103
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	104
SIDE	DI-67	ELECTROMETER RANGE	15	ODD	4-10	7/256	6	105
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	106
SIDE	DI-65	MODE REGISTER	15	ODD	4-10	26/256	6	107
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	108
SIDE	DI-64	COMMAND REGISTER	15	ODD	4-10	24/256	6	109
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	110
SIDE	DI-65	MODE REGISTER	15	ODD	4-10	26/256	6	111
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	112
SIDE	DI-64	COMMAND REGISTER	15	ODD	4-10	24/256	6	113
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	114
SIDE	DI-65	MODE REGISTER	15	ODD	4-10	26/256	6	115
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	116
SIDE	DI-64	COMMAND REGISTER	15	ODD	4-10	24/256	6	117
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	118
SIDE	DI-65	MODE REGISTER	15	ODD	4-10	26/256	6	119

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD	FRM	BITS	S/MF	SIDE WD	SIDE FRAME	FG BT
SIDE	DI-68	CAL RATE-1 STATUS	15	ODD	4-10	2/256	6	120	
SIDE	DI-69	CAL RATE-2 STATUS	15	ODD	4-10	1/256	6	121	
SIDE	DI-70	CAL RATE-3 STATUS	15	ODD	4-10	2/256	6	122	
SIDE	DI-71	CAL RATE-4 STATUS	15	ODD	4-10	2/256	6	123	
SIDE	DI-68	CAL RATE-1 STATUS	15	ODD	4-10	2/256	6	124	
SIDE	DI-64	COMMAND REGISTER	15	ODD	4-10	24/256	6	125	
SIDE	DI-70	CAL RATE-3 STATUS	15	ODD	4-10	2/256	6	126	
SIDE	DI-71	CAL RATE-4 STATUS	15	ODD	4-10	2/256	6	127	
SIDE		FILL ZEROS	31	ODD	1-2	128/256	7	0-127	
SIDE	DI-72	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7	0	
SIDE	DI-73	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7	1	
SIDE	DI-74	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7	2	
SIDE	DI-75	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7	3	
SIDE	DI-76	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7	4	
SIDE	DI-77	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7	5	
SIDE	DI-78	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7	6	
SIDE	DI-79	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7	7	
SIDE	DI-80	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7	8	
SIDE	DI-81	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7	9	
SIDE	DI-82	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7	10	
SIDE	DI-83	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7	11	
SIDE	DI-84	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7	12	
SIDE	DI-85	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7	13	
SIDE	DI-86	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7	14	
SIDE	DI-87	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7	15	
SIDE	DI-88	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7	16	
SIDE	DI-89	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7	17	
SIDE	DI-90	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7	18	
SIDE	DI-91	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7	19	
SIDE	DI-92	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7	20	
SIDE	DI-93	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7	21	
SIDE	DI-94	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7	22	
SIDE	DI-95	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7	23	
SIDE	DI-96	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7	24	
SIDE	DI-97	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7	25	

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD FRM BITS	S/MF	SIDE WD	SIDE FRAME	PA BY
SIDE	DI-98	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	26	
SIDE	DI-99	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	27	
SIDE	DJ-0	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	28	
SIDE	DJ-1	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	29	
SIDE	DJ-2	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	30	
SIDE	DJ-3	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	31	
SIDE	DJ-4	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	32	
SIDE	DJ-5	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	33	
SIDE	DJ-6	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	34	
SIDE	DJ-7	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	35	
SIDE	DJ-8	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	36	
SIDE	DJ-9	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	37	
SIDE	DJ-10	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	38	
SIDE	DJ-11	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	39	
SIDE	DJ-12	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	40	
SIDE	DJ-13	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	41	
SIDE	DJ-14	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	42	
SIDE	DJ-15	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	43	
SIDE	DJ-16	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	44	
SIDE	DJ-17	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	45	
SIDE	DJ-18	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	46	
SIDE	DJ-19	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	47	
SIDE	DJ-20	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	48	
SIDE	DJ-21	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	49	
SIDE	DJ-22	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	50	
SIDE	DJ-23	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	51	
SIDE	DJ-24	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	52	
SIDE	DJ-25	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	53	
SIDE	DJ-26	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	54	
SIDE	DJ-27	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	55	
SIDE	DJ-28	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	56	
SIDE	DJ-29	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	57	
SIDE	DJ-30	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	58	
SIDE	DJ-31	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	59	
SIDE	DJ-32	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	60	

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EXP NAME	MEAS NO	MEAS NAME	ALSEP WD FRM BITS	S/MF	SIDE WD	SIDE FRAME	FG BT
SIDE	DJ-33	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	61	
SIDE	DJ-34	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	62	
SIDE	DJ-35	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	63	
SIDE	DJ-36	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	64	
SIDE	DJ-37	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	65	
SIDE	DJ-38	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	66	
SIDE	DJ-39	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	67	
SIDE	DJ-40	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	68	
SIDE	DJ-41	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	69	
SIDE	DJ-42	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	70	
SIDE	DJ-43	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	71	
SIDE	DJ-44	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	72	
SIDE	DJ-45	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	73	
SIDE	DJ-46	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	74	
SIDE	DJ-47	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	75	
SIDE	DJ-48	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	76	
SIDE	DJ-49	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	77	
SIDE	DJ-50	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	78	
SIDE	DJ-51	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	79	
SIDE	DJ-52	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	80	
SIDE	DJ-53	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	81	
SIDE	DJ-54	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	82	
SIDE	DJ-55	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	83	
SIDE	DJ-56	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	84	
SIDE	DJ-57	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	85	
SIDE	DJ-58	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	86	
SIDE	DJ-59	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	87	
SIDE	DJ-60	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	88	
SIDE	DJ-61	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	89	
SIDE	DJ-62	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	90	
SIDE	DJ-63	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	91	
SIDE	DJ-64	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	92	
SIDE	DJ-65	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	93	
SIDE	DJ-66	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	94	
SIDE	DJ-67	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	95	

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD	FRM	BITS	S/MF	SIDE WD	SIDE FRAME	FG BT
SIDE	DJ-68	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7		96
SIDE	DJ-69	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7		97
SIDE	DJ-70	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7		98
SIDE	DJ-71	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7		99
SIDE	DJ-72	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7		100
SIDE	DJ-73	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7		101
SIDE	DJ-74	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7		102
SIDE	DJ-75	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7		103
SIDE	DJ-76	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7		104
SIDE	DJ-77	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7		105
SIDE	DJ-78	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7		106
SIDE	DJ-79	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7		107
SIDE	DJ-80	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7		108
SIDE	DJ-81	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7		109
SIDE	DJ-82	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7		110
SIDE	DJ-83	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7		111
SIDE	DJ-84	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7		112
SIDE	DJ-85	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7		113
SIDE	DJ-86	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7		114
SIDE	DJ-87	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7		115
SIDE	DJ-88	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7		116
SIDE	DJ-89	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7		117
SIDE	DJ-90	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7		118
SIDE	DJ-91	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7		119
SIDE	DJ-92	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7		120
SIDE	DJ-93	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7		121
SIDE	DJ-94	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7		122
SIDE	DJ-95	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7		123
SIDE	DJ-96	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7		124
SIDE	DJ-97	VEL FILTER VOLTAGE	31	ODD	3-10	3/256	7		125
SIDE	DJ-97	VEL FILTER VOLTAGE	31	ODD	3-10	3/256	7		126
SIDE	DJ-97	VEL FILTER VOLTAGE	31	ODD	3-10	3/256	7		127
SIDE		FILL ZEROS	47	ODD	1-2	128/256	8	0-	127
SIDE	DJ-98	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8		0
SIDE	DJ-98	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8		1

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD FRM	BITS	S/MF	SIDE WD	SIDE FRAME	FG BT
SIDE	DJ-98	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		2
SIDE	DJ-98	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		3
SIDE	DJ-98	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		4
SIDE	DJ-98	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		5
SIDE	DJ-98	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		6
SIDE	DJ-98	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		7
SIDE	DJ-98	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		8
SIDE	DJ-98	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		9
SIDE	DJ-98	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		10
SIDE	DJ-98	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		11
SIDE	DJ-98	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		12
SIDE	DJ-98	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		13
SIDE	DJ-98	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		14
SIDE	DJ-98	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		15
SIDE	DJ-98	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		16
SIDE	DJ-98	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		17
SIDE	DJ-98	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		18
SIDE	DJ-98	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		19
SIDE	DJ-99	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		20
SIDE	DJ-99	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		21
SIDE	DJ-99	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		22
SIDE	DJ-99	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		23
SIDE	DJ-99	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		24
SIDE	DJ-99	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		25
SIDE	DJ-99	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		26
SIDE	DJ-99	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		27
SIDE	DJ-99	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		28
SIDE	DJ-99	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		29
SIDE	DJ-99	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		30
SIDE	DJ-99	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		31
SIDE	DJ-99	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		32
SIDE	DJ-99	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		33
SIDE	DJ-99	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		34
SIDE	DJ-99	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		35
SIDE	DJ-99	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		36

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD FRM BITS	S/MF	SIDE WD	SIDE FRAME	FG BT
SIDE	DJ-99	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		37
SIDE	DJ-99	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		38
SIDE	DJ-99	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		39
SIDE	DF-0	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		40
SIDE	DF-0	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		41
SIDE	DF-0	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		42
SIDE	DF-0	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		43
SIDE	DF-0	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		44
SIDE	DF-0	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		45
SIDE	DF-0	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		46
SIDE	DF-0	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		47
SIDE	DF-0	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		48
SIDE	DF-0	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		49
SIDE	DF-0	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		50
SIDE	DF-0	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		51
SIDE	DF-0	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		52
SIDE	DF-0	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		53
SIDE	DF-0	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		54
SIDE	DF-0	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		55
SIDE	DF-0	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		56
SIDE	DF-0	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		57
SIDE	DF-0	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		58
SIDE	DF-0	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		59
SIDE	DF-1	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		60
SIDE	DF-1	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		61
SIDE	DF-1	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		62
SIDE	DF-1	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		63
SIDE	DF-1	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		64
SIDE	DF-1	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		65
SIDE	DF-1	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		66
SIDE	DF-1	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		67
SIDE	DF-1	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		68
SIDE	DF-1	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		69
SIDE	DF-1	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		70
SIDE	DF-1	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		71

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD FRM	BITS	S/MF	SIDE WD	SIDE FRAME	FG BT
SIDE	DF-1	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8	72	
SIDE	DF-1	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8	73	
SIDE	DF-1	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8	74	
SIDE	DF-1	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8	75	
SIDE	DF-1	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8	76	
SIDE	DF-1	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8	77	
SIDE	DF-1	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8	78	
SIDE	DF-1	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8	79	
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8	80	
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8	81	
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8	82	
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8	83	
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8	84	
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8	85	
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8	86	
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8	87	
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8	88	
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8	89	
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8	90	
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8	91	
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8	92	
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8	93	
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8	94	
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8	95	
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8	96	
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8	97	
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8	98	
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8	99	
SIDE	DF-3	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8	100	
SIDE	DF-3	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8	101	
SIDE	DF-3	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8	102	
SIDE	DF-3	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8	103	
SIDE	DF-3	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8	104	
SIDE	DF-3	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8	105	
SIDE	DF-3	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8	106	

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD FRM	BITS	S/MF	SIDE WD	SIDE FRAME	FG BT
SIDE	DF-3	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8	107	
SIDE	DF-3	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8	108	
SIDE	DF-3	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8	109	
SIDE	DF-3	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8	110	
SIDE	DF-3	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8	111	
SIDE	DF-3	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8	112	
SIDE	DF-3	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8	113	
SIDE	DF-3	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8	114	
SIDE	DF-3	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8	115	
SIDE	DF-3	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8	116	
SIDE	DF-3	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8	117	
SIDE	DF-3	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8	118	
SIDE	DF-3	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8	119	
SIDE	DF-4	LECPA STEP VOLTAGE	47	ODD 3-10	8/256	8	120	
SIDE	DF-4	LECPA STEP VOLTAGE	47	ODD 3-10	8/256	8	121	
SIDE	DF-4	LECPA STEP VOLTAGE	47	ODD 3-10	8/256	8	122	
SIDE	DF-4	LECPA STEP VOLTAGE	47	ODD 3-10	8/256	8	123	
SIDE	DF-4	LECPA STEP VOLTAGE	47	ODD 3-10	8/256	8	124	
SIDE	DF-4	LECPA STEP VOLTAGE	47	ODD 3-10	8/256	8	125	
SIDE	DF-4	LECPA STEP VOLTAGE	47	ODD 3-10	8/256	8	126	
SIDE	DF-4	LECPA STEP VOLTAGE	47	ODD 3-10	8/256	8	127	
SIDE	DF-5	LE DATA - MSD	56	ODD 1-10	128/256	9	0-127	
SIDE	DF-6	LE DATA - LSD	63	ODD 1-10	128/256	10	0-127	

1.2.1.6.3 SIDE RESET VELOCITY FILTER @9 LISTING

DOWNLINK LISTINGS COLUMN HEADERS

Col.	1	Experiment name.
Col.	2	Measurement number. (An asterisk in col. 11 indicates that the word is subcommand)
Col.	3	Measurement name.
Col.	4	ALSEP main frame (1-64) word. An asterisk in this column indicates that experiment's words are asynchronous with respect to the ALSEP main frame word.
Col.	5	ALSEP frame. The ALSEP frame number as read from the ALSEP frame counter in ALSEP word 3. The ALSEP frame counter counts from 1-89, and then to 0, which represents 90. Columns 46-48 may contain one of the following words: ALL = All ALSEP main frames EVN = Even numbered ALSEP main frames ODD = Odd numbered ALSEP main frames. An asterisk in this column indicates that this parameter is asynchronous with respect to the ALSEP frame.
Col.	6	Bits. Indicates which of the ten bits (1-10) of an ALSEP or experiment word contain the measurement number given in columns 7-11.
Col.	7	Samples per Main Frame (S/MF). Indicates how often (on the average) a parameter appear in the ALSEP main frame.
Col.	8	Experiment word. For the LSM these columns indicate the LSM word number (1-16) For the SIDE these columns indicate the SIDE word number (1-10) For the SWS these columns indicate the SWS word number (0-185)
Col.	9	Experiment Frame. For the SWS these columns indicate the SWS sequence number (0-15) For the SIDE these columns indicate the SIDE frame number (0-127)
Col.	10	Flag bits.

SIDE WORDS 7&8 - RESET @9 FORMAT

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD	FRM	BITS	S/MF	SIDE WD	SIDE FRAME	FG BT
SIDE		FILL ZEROS	31	ODD	1-2	128/256	7	0-127	
SIDE		FILL ZEROS	47	ODD	1-2	128/256	8	0-127	
SIDE	DI-72	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	0	
SIDE	DI-73	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	1	
SIDE	DI-74	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	2	
SIDE	DI-75	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	3	
SIDE	DI-76	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	4	
SIDE	DI-77	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	5	
SIDE	DI-78	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	6	
SIDE	DI-79	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	7	
SIDE	DI-80	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	8	
SIDE	DI-81	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	9	
SIDE	DI-92	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	10	
SIDE	DI-93	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	11	
SIDE	DI-94	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	12	
SIDE	DI-95	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	13	
SIDE	DI-96	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	14	
SIDE	DI-97	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	15	
SIDE	DI-98	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	16	
SIDE	DI-99	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	17	
SIDE	DJ-0	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	18	
SIDE	DJ-1	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	19	
SIDE	DJ-12	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	20	
SIDE	DJ-13	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	21	
SIDE	DJ-14	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	22	
SIDE	DJ-15	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	23	
SIDE	DJ-16	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	24	
SIDE	DJ-17	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	25	
SIDE	DJ-18	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	26	
SIDE	DJ-19	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	27	
SIDE	DJ-20	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	28	
SIDE	DJ-21	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	29	
SIDE	DJ-32	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	30	
SIDE	DJ-33	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	31	
SIDE	DJ-34	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	32	

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD FRM	BITS	S/MF	SIDE WD	SIDE FRAME	FG BT
SIDE	DJ-35	VEL FILTER VOLTAGE	31	ODD 3-10	2/256	7	33	
SIDE	DJ-36	VEL FILTER VOLTAGE	31	ODD 3-10	2/256	7	34	
SIDE	DJ-37	VEL FILTER VOLTAGE	31	ODD 3-10	2/256	7	35	
SIDE	DJ-38	VEL FILTER VOLTAGE	31	ODD 3-10	2/256	7	36	
SIDE	DJ-39	VEL FILTER VOLTAGE	31	ODD 3-10	2/256	7	37	
SIDE	DJ-40	VEL FILTER VOLTAGE	31	ODD 3-10	2/256	7	38	
SIDE	DJ-41	VEL FILTER VOLTAGE	31	ODD 3-10	2/256	7	39	
SIDE	DJ-52	VEL FILTER VOLTAGE	31	ODD 3-10	2/256	7	40	
SIDE	DJ-53	VEL FILTER VOLTAGE	31	ODD 3-10	2/256	7	41	
SIDE	DJ-54	VEL FILTER VOLTAGE	31	ODD 3-10	2/256	7	42	
SIDE	DJ-55	VEL FILTER VOLTAGE	31	ODD 3-10	2/256	7	43	
SIDE	DJ-56	VEL FILTER VOLTAGE	31	ODD 3-10	2/256	7	44	
SIDE	DJ-57	VEL FILTER VOLTAGE	31	ODD 3-10	2/256	7	45	
SIDE	DJ-58	VEL FILTER VOLTAGE	31	ODD 3-10	2/256	7	46	
SIDE	DJ-59	VEL FILTER VOLTAGE	31	ODD 3-10	2/256	7	47	
SIDE	DJ-60	VEL FILTER VOLTAGE	31	ODD 3-10	2/256	7	48	
SIDE	DJ-61	VEL FILTER VOLTAGE	31	ODD 3-10	2/256	7	49	
SIDE	DJ-72	VEL FILTER VOLTAGE	31	ODD 3-10	2/256	7	50	
SIDE	DJ-73	VEL FILTER VOLTAGE	31	ODD 3-10	2/256	7	51	
SIDE	DJ-74	VEL FILTER VOLTAGE	31	ODD 3-10	2/256	7	52	
SIDE	DJ-75	VEL FILTER VOLTAGE	31	ODD 3-10	2/256	7	53	
SIDE	DJ-76	VEL FILTER VOLTAGE	31	ODD 3-10	2/256	7	54	
SIDE	DJ-77	VEL FILTER VOLTAGE	31	ODD 3-10	2/256	7	55	
SIDE	DJ-78	VEL FILTER VOLTAGE	31	ODD 3-10	2/256	7	56	
SIDE	DJ-79	VEL FILTER VOLTAGE	31	ODD 3-10	2/256	7	57	
SIDE	DJ-80	VEL FILTER VOLTAGE	31	ODD 3-10	2/256	7	58	
SIDE	DJ-81	VEL FILTER VOLTAGE	31	ODD 3-10	2/256	7	59	
SIDE	DI-72	VEL FILTER VOLTAGE	31	ODD 3-10	2/256	7	60	
SIDE	DI-73	VEL FILTER VOLTAGE	31	ODD 3-10	2/256	7	61	
SIDE	DI-74	VEL FILTER VOLTAGE	31	ODD 3-10	2/256	7	62	
SIDE	DI-75	VEL FILTER VOLTAGE	31	ODD 3-10	2/256	7	63	
SIDE	DI-76	VEL FILTER VOLTAGE	31	ODD 3-10	2/256	7	64	
SIDE	DI-77	VEL FILTER VOLTAGE	31	ODD 3-10	2/256	7	65	
SIDE	DI-78	VEL FILTER VOLTAGE	31	ODD 3-10	2/256	7	66	
SIDE	DI-79	VEL FILTER VOLTAGE	31	ODD 3-10	2/256	7	67	
SIDE	DI-80	VEL FILTER VOLTAGE	31	ODD 3-10	2/256	7	68	
SIDE	DI-81	VEL FILTER VOLTAGE	31	ODD 3-10	2/256	7	69	

1.2-64

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD	FRM	BITS	S/MF	SIDE WD	SIDE FRAME	FG BT
SIDE	DI-92	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	70	
SIDE	DI-93	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	71	
SIDE	DI-94	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	72	
SIDE	DI-95	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	73	
SIDE	DI-96	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	74	
SIDE	DI-97	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	75	
SIDE	DI-98	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	76	
SIDE	DI-99	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	77	
SIDE	DJ-0	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	78	
SIDE	DJ-1	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	79	
SIDE	DJ-12	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	80	
SIDE	DJ-13	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	81	
SIDE	DJ-14	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	82	
SIDE	DJ-15	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	83	
SIDE	DJ-16	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	84	
SIDE	DJ-17	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	85	
SIDE	DJ-18	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	86	
SIDE	DJ-19	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	87	
SIDE	DJ-20	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	88	
SIDE	DJ-21	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	89	
SIDE	DJ-32	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	90	
SIDE	DJ-33	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	91	
SIDE	DJ-34	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	92	
SIDE	DJ-35	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	93	
SIDE	DJ-36	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	94	
SIDE	DJ-37	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	95	
SIDE	DJ-38	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	96	
SIDE	DJ-39	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	97	
SIDE	DJ-40	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	98	
SIDE	DJ-41	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	99	
SIDE	DJ-52	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	100	
SIDE	DJ-53	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	101	
SIDE	DJ-54	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	102	
SIDE	DJ-55	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	103	
SIDE	DJ-56	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	104	

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD FRM	RITS	S/MF	SIDE WD	SIDE FRAME	FG BT
SIDE	DJ-57	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	105
SIDE	DJ-58	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	106
SIDE	DJ-59	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	107
SIDE	DJ-60	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	108
SIDE	DJ-61	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	109
SIDE	DJ-72	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	110
SIDE	DJ-73	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	111
SIDE	DJ-74	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	112
SIDE	DJ-75	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	113
SIDE	DJ-76	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	114
SIDE	DJ-77	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	115
SIDE	DJ-78	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	116
SIDE	DJ-79	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	117
SIDE	DJ-80	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	118
SIDE	DJ-81	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	119
SIDE	DJ-92	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7	120
SIDE	DJ-93	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7	121
SIDE	DJ-94	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7	122
SIDE	DJ-95	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7	123
SIDE	DJ-96	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7	124
SIDE	DJ-97	VEL FILTER VOLTAGE	31	ODD	3-10	3/256	7	125
SIDE	DJ-97	VEL FILTER VOLTAGE	31	ODD	3-10	3/256	7	126
SIDE	DJ-97	VEL FILTER VOLTAGE	31	ODD	3-10	3/256	7	127
SIDE	DJ-98	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	0
SIDE	DJ-98	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	1
SIDE	DJ-98	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	2
SIDE	DJ-98	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	3
SIDE	DJ-98	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	4
SIDE	DJ-98	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	5
SIDE	DJ-98	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	6
SIDE	DJ-98	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	7
SIDE	DJ-98	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	8
SIDE	DJ-98	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	9
SIDE	DJ-99	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	10
SIDE	DJ-99	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	11

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EXP NAME	MEAS NO	MEAS NAME	ALSEP WD FRM	RITS	S/MF	SIDE WD	SIDE FRAME	FG BT
SIDE	DJ-99	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8	12	
SIDE	DJ-99	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8	13	
SIDE	DJ-99	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8	14	
SIDE	DJ-99	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8	15	
SIDE	DJ-99	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8	16	
SIDE	DJ-99	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8	17	
SIDE	DJ-99	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8	18	
SIDE	DJ-99	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8	19	
SIDE	DF-0	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8	20	
SIDE	DF-0	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8	21	
SIDE	DF-0	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8	22	
SIDE	DF-0	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8	23	
SIDE	DF-0	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8	24	
SIDE	DF-0	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8	25	
SIDE	DF-0	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8	26	
SIDE	DF-0	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8	27	
SIDE	DF-0	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8	28	
SIDE	DF-0	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8	29	
SIDE	DF-1	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8	30	
SIDE	DF-1	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8	31	
SIDE	DF-1	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8	32	
SIDE	DF-1	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8	33	
SIDE	DF-1	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8	34	
SIDE	DF-1	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8	35	
SIDE	DF-1	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8	36	
SIDE	DF-1	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8	37	
SIDE	DF-1	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8	38	
SIDE	DF-1	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8	39	
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8	40	
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8	41	
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8	42	
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8	43	
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8	44	
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8	45	
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8	46	

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EXP NAME	MEAS NO	MEAS NAME	ALSEP WD	FRM	BITS	S/MF	SIDE WD	SIDE FRAME	FG BT
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8	47	
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8	48	
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8	49	
SIDE	DF-3	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8	50	
SIDE	DF-3	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8	51	
SIDE	DF-3	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8	52	
SIDE	DF-3	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8	53	
SIDE	DF-3	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8	54	
SIDE	DF-3	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8	55	
SIDE	DF-3	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8	56	
SIDE	DF-3	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8	57	
SIDE	DF-3	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8	58	
SIDE	DF-3	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8	59	
SIDE	DJ-98	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8	60	
SIDE	DJ-98	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8	61	
SIDE	DJ-98	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8	62	
SIDE	DJ-98	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8	63	
SIDE	DJ-98	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8	64	
SIDE	DJ-98	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8	65	
SIDE	DJ-98	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8	66	
SIDE	DJ-98	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8	67	
SIDE	DJ-98	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8	68	
SIDE	DJ-98	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8	69	
SIDE	DJ-99	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8	70	
SIDE	DJ-99	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8	71	
SIDE	DJ-99	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8	72	
SIDE	DJ-99	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8	73	
SIDE	DJ-99	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8	74	
SIDE	DJ-99	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8	75	
SIDE	DJ-99	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8	76	
SIDE	DJ-99	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8	77	
SIDE	DJ-99	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8	78	
SIDE	DJ-99	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8	79	
SIDE	DF-0	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8	80	
SIDE	DF-0	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8	81	

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD	FRM	BITS	S/MF	SIDE WD	SIDE FRAME	FG BT
SIDE	DF-0	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	82	
SIDE	DF-0	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	83	
SIDE	DF-0	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	84	
SIDE	DF-0	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	85	
SIDE	DF-0	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	86	
SIDE	DF-0	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	87	
SIDE	DF-0	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	88	
SIDE	DF-0	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	89	
SIDE	DF-1	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	90	
SIDE	DF-1	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	91	
SIDE	DF-1	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	92	
SIDE	DF-1	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	93	
SIDE	DF-1	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	94	
SIDE	DF-1	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	95	
SIDE	DF-1	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	96	
SIDE	DF-1	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	97	
SIDE	DF-1	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	98	
SIDE	DF-1	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	99	
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	100	
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	101	
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	102	
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	103	
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	104	
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	105	
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	106	
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	107	
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	108	
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	109	
SIDE	DF-3	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	110	
SIDE	DF-3	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	111	
SIDE	DF-3	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	112	
SIDE	DF-3	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	113	
SIDE	DF-3	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	114	
SIDE	DF-3	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	115	
SIDE	DF-3	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	116	
SIDE	DF-3	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	117	
SIDE	DF-3	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	118	
SIDE	DF-3	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	119	
SIDE	DF-4	LECPA STEP VOLTAGE	47	ODD	3-10	8/256	8	120	
SIDE	DF-4	LECPA STEP VOLTAGE	47	ODD	3-10	8/256	8	121	
SIDE	DF-4	LECPA STEP VOLTAGE	47	ODD	3-10	8/256	8	122	
SIDE	DF-4	LECPA STEP VOLTAGE	47	ODD	3-10	8/256	8	123	
SIDE	DF-4	LECPA STEP VOLTAGE	47	ODD	3-10	8/256	8	124	
SIDE	DF-4	LECPA STEP VOLTAGE	47	ODD	3-10	8/256	8	125	
SIDE	DF-4	LECPA STEP VOLTAGE	47	ODD	3-10	8/256	8	126	
SIDE	DF-4	LECPA STEP VOLTAGE	47	ODD	3-10	8/256	8	127	

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APPENDIX B

APOLLO 14 - ALSEP 4

This appendix has been taken from the *Data Acquisition Plan, Annex B-1, ALSEP Telemetry Data Format Control Book*, prepared by Philco-Ford, Houston Operations, July 1972. Modifications to this material were made by Lockheed Electronics Company, Inc.

- 1.4 ALSEP 4, ARRAY C, APOLLO 14
- 1.4.1 Normal/Slow PCM Telemetry Downlink Description
- 1.4.1.1 General Description
- 1.4.1.1.1 Downlink Data Rates

APOLLO LUNAR SURFACE EXPERIMENTS PACKAGE (ALSEP) PCM Telemetry is downlinked at either a normal or slow data rate as shown below. The downlinked bit rate is selectable upon Earth command.

Normal Data Rate	Slow Data Rate
. 1060 bits/sec	. 530 bits/sec
. 10 bits/word	. 10 bits/word
. 64 words/frame	. 64 bits/frame
. 640 bits/frame	. 640 bits/frame
. 0.943 ms/bit	. 1.887 ms/bit
. 9.43 ms/word	. 18.87 ms/word
. 603.773 ms/frame	. 1.21 sec/frame
. Data are transmitted MSB first (Bit 1).	

The major subsystems included in Flight System Four are:

I. Data System (CONT)	5 words
A. Control	
B. Command Verification	
C. Housekeeping	
II. Passive Seismic Experiment (PSE)	44 words
III. Charged Particle Lunar Environment Experiment (CPLEE)	6 words
* IV. Suprathermal Ion Detector Experiment (SIDE)	5 words
V. Unassigned	4 words
	<u>64 words</u> TOTAL

*The number of each experiment is mission specific and is called out in the ALSEP CDFCB

1.4.1.1.2 ALSEP MAIN FRAME WORD ASSIGNMENT

1 CONT	2 CONT.	3 CONT.	4 PSE	5 COMMAND VERIFI- CATION	6 PSE	7 CPLEE	8 PSE
9 PSE	10 PSE	11 PSE	12 PSE	13 PSE	14 PSE	15 SIDE	16 PSE
17 CPLEE	18 PSE	19 CPLEE	20 PSE	21 *N/A	22 PSE	23 CPLEE	24 PSE
25 PSE	26 PSE	27 PSE	28 PSE	29 PSE	30 PSE	31 SIDE	32 PSE
33 HOUSE- KEEPING	34 PSE	35 PSE	36 PSE	37 PSE	38 PSE	39 CPLEE	40 PSE
41 PSE	42 PSE	43 PSE	44 PSE	45 PSE	46 PSE	47 SIDE	48 PSE
49 *N/A	50 PSE	51 *N/A	52 PSE	53 *N/A	54 PSE	55 CPLEE	56 SIDE
57 PSE	58 PSE	59 PSE	60 PSE	61 PSE	62 PSE	63 SIDE	64 PSE

Each box contains one 10-bit word

*N/A: Not Assigned

Total bits per frame -- 10 x 64 = 640 bits

1.4.1.1.3 ALSEP MAIN FRAME PARAMETER LISTING

DOWNLINK LISTINGS COLUMN HEADERS

Col.	1	Experiment name.				
Col.	2	Measurement number. (An asterisk in col. 11 indicates that the word is subcommed)				
Col.	3	Measurement name.				
Col.	4	ALSEP main frame (1-64) word. An asterisk in this column indicates that experiment's words are asynchronous with respect to the ALSEP main frame word.				
Col.	5	<p>ALSEP frame. The ALSEP frame number as read from the ALSEP frame counter in ALSEP word 3. The ALSEP frame counter counts from 1-89, and then to 0, which represents 90. Columns 46-48 may contain one of the following words:</p> <p>ALL = ALL ALSEP main frames. EVN = Even numbered ALSEP main frames. ODD = Odd numbered ALSEP main frames.</p> <p>An asterisk in this column indicates that this parameter is asynchronous with respect to the ALSEP frames.</p>				
Col.	6	Bits. Indicates which of the ten or twenty bits of an ALSEP (1-10) or experiment (1-10 or 1-20) word contain the measurement number given in columns 7-11.				
Col.	7	Samples per Main Frame (S/MF). Indicates how often (on the average) a parameter appears in the ALSEP main frame.				
Col.	8	<p>Experiment word. For the SIDE these columns indicate the SIDE word number (1-5) For the CPLEE these columns indicate the CPLEE word number (1-32)</p>				
Col.	9	Experiment Frame. For the side these columns indicate the SIDE frame number (0-127)				
Col.	10	Flag bits				

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD	FRM	RITS	S/MF	EXPERIMENT WD	FG FRAME	BT
CONT	DA-1A	SYNC (1110001001)	1	ALL	1-10	1			
CONT	DA-1B	SYNC (0000111011)	2	ALL	1-10	1			
CONT	WD03*	SYNC, CTR, AND ID	3	ALL	1-10	1			
PSE	DL-8	SP SEISMIC Z	4	ALL	1-10	30			
CONT	WD05*	CMD VERIFY + CAP WD	5	ALL	1-10	1			
PSE	DL-8	SP SEISMIC Z	6	ALL	1-10	30			
CPLE	WL07*	CPLLE WORDS (1-32)	7	ALL	1-10	6			
PSE	DL-8	SP SEISMIC Z	8	ALL	1-10	30			
PSE	DL-1	LP SEISMIC X	9	ALL	1-10	4			
PSE	DL-8	SP SEISMIC Z	10	ALL	1-10	30			
PSE	DL-2	LP SEISMIC Y	11	ALL	1-10	4			
PSE	DL-8	SP SEISMIC Z	12	ALL	1-10	30			
PSE	DL-3	LP SEISMIC Z	13	ALL	1-10	4			
PSE	DL-8	SP SEISMIC Z	14	ALL	1-10	30			
SIDE	WD15*	SIDE WORD 1 OR 6	15	ALL	1-10	1			
PSE	DL-8	SP SEISMIC Z	16	ALL	1-10	30			
CPLE	WD17*	CPLLE WORDS (1-32)	17	ALL	1-10	6			
PSE	DL-8	SP SEISMIC Z	18	ALL	1-10	30			
CPLE	WD19*	CPLLE WORDS (1-32)	19	ALL	1-10	6			
PSE	DL-8	SP SEISMIC Z	20	ALL	1-10	30			
		UNASSIGNED	21	ALL	1-10	1			
PSE	DL-8	SP SEISMIC Z	22	ALL	1-10	30			
CPLE	WD23*	CPLLE WORDS (1-32)	23	ALL	1-10	6			
PSE	DL-8	SP SEISMIC Z	24	ALL	1-10	30			
PSE	DL-1	LP SEISMIC X	25	ALL	1-10	4			
PSE	DL-8	SP SEISMIC Z	26	ALL	1-10	30			
PSE	DL-2	LP SEISMIC Y	27	ALL	1-10	4			
PSE	DL-8	SP SEISMIC Z	28	ALL	1-10	30			
PSE	DL-3	LP SEISMIC Z	29	ALL	1-10	4			
PSE	DL-8	SP SEISMIC Z	30	ALL	1-10	30			
SIDE	WD31*	SIDE WORD 2 OR 7	31	ALL	1-10	1			
PSE	DL-8	SP SEISMIC Z	32	ALL	1-10	30			
CONT	WD33*	HOUSEKEEPING	33	ALL	1-10	1			
PSE	DL-8	SP SEISMIC Z	34	ALL	1-10	30			
PSE	WD35*	TIDAL X OR Z	35	ALL	1-10	1			

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD FRM	BITS	S/MF	EXPERIMENT WD	FRAME	FG BT
PSE	DL-8	SP SEISMIC Z	36	ALL 1-10	30			
PSE	WD37*	TIDAL Y OR SENSOR UNIT TEMP	37	ALL 1-10	1			
PSE	DL-8	SP SEISMIC Z	38	ALL 1-10	30			
CPLE	WD39*	CPL EE WORDS (1-32)	39	ALL 1-10	6			
PSE	DL-8	SP SEISMIC Z	40	ALL 1-10	30			
PSE	DL-1	LP SEISMIC X	41	ALL 1-10	4			
PSE	DL-8	SP SEISMIC Z	42	ALL 1-10	30			
PSE	DL-2	LP SEISMIC Y	43	ALL 1-10	4			
PSE	DL-8	SP SEISMIC Z	44	ALL 1-10	30			
PSE	DL-3	LP SEISMIC Z	45	ALL 1-10	4			
PSE	DL-8	SP SEISMIC Z	46	ALL 1-10	30			
SIDE	WD47*	SIDE WORD 3 OR 8	47	ALL 1-10	1			
PSE	DL-8	SP SEISMIC Z	48	ALL 1-10	30			
		UNASSIGNED	49	ALL 1-10				
PSE	DL-8	SP SEISMIC Z	50	ALL 1-10	30			
		UNASSIGNED	51	ALL 1-10				
PSE	DL-8	SP SEISMIC Z	52	ALL 1-10	30			
		UNASSIGNED	53	ALL 1-10				
PSE	DL-8	SP SEISMIC Z	54	ALL 1-10	30			
CPLE	WD55*	CPL EE WORDS (1-32)	55	ALL 1-10	6			
SIDE	WD56*	SIDE WORD 4 OR 9	56	ALL 1-10	1			
PSE	DL-1	LP SEISMIC X	57	ALL 1-10	4			
PSE	DL-8	SP SEISMIC Z	58	ALL 1-10	30			
PSE	DL-2	LP SEISMIC Y	59	ALL 1-10	4			
PSE	DL-8	SP SEISMIC Z	60	ALL 1-10	30			
PSE	DL-3	LP SEISMIC Z	61	ALL 1-10	4			
PSE	DL-8	SP SEISMIC Z	62	ALL 1-10	30			
SIDE	WD63*	SIDE WORD 5 OR 10	63	ALL 1-10	1			
PSE	DL-8	SP SEISMIC Z	64	ALL 1-10	30			

1.4.1.2 ALSEP ARRAY C SYSTEM CONTROL WORDS (CONT)

Control and support of the ALSEP system is monitored through 5 main frame ALSEP words: 1, 2, 3, 5, and 33.

1.4.1.2.1 ALSEP Words 1, 2, and 3

The first 22-bits included in words 1, 2, and 3 contain the main frame sync. Bits 3 through 9 of ALSEP Word 3 contains the frame counter used to identify the parameters output by the 90-channel subcommutator. The frame counter counts from 1-89 then resets to 0 upon reaching the 90th channel. Loss of synchronization between the frame counter and 90 channel subcommutator may cause up to 54 seconds of invalid data. Bit-10 of Word 3 is the Mode Bit, which identifies Bit Rate or ALSEP ID on designated frames according to the frame counter. The configuration of the three words is as shown below:

1st bit downlinked

	← ALSEP WORD # 1 →										← ALSEP WORD # 2 →										← ALSEP WORD # 3 →												
	MSB					LSB					MSB					LSB					MSB					LSB							
BIT NO	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10			
BT WT	1	1	1	0	0	0	1	0	0	1	0	0	0	0	1	1	1	0	1	1	0	1	1	0	1	2 ⁶	2 ⁵	2 ⁴	2 ³	2 ²	2 ¹	2 ⁰	
CONTENT	MAIN FRAME SYNC																				FRAME COUNTER (1 - 89,0)					MODE BIT							

FRM MODE BIT

- 1 : 1 = Normal Data Rate
- 2 : 1 = Slow Data Rate
- 3 : 1 (MSB) ALSEP ARRAY C
- 4 : 1 Data Proc.
- 5 : 0 (LSB) Serial No.

Mode Bit = 0 for all other frames.

1.4.1.2.2 ALSEP Word5 - Command Verification Word

Command Verification is provided in ALSEP Word 5. The configuration is shown below. Bits 3 through 9 reflect the 7-bit command as received by the ALSEP, and bit-10 is a message acceptance pulse (MAP). The MAP reads out a "1" when an error check has been successful and a command has been acted upon. The Command Verification Word reads zeroes except during the one ALSEP main frame following receipt of a command.

1st bit downlinked

	MSB										LSB
BIT NO	1	2	3	4	5	6	7	8	9	10	
CONTENT	*	*	COMMAND RECEIVED								↑

MAP:

* Bits 1 and 2 will be set to the same value as bit 3.

0=Command Parity Check Failed
1=Bit by bit check of command and complement verified

1.4.1.2.3 ALSEP Word33 - Housekeeping

ALSEP Word 33 is the output of the 90-channel subcommutator. The 90 parameters of housekeeping data (voltages, temperatures, etc.) have the configuration as shown below. Some of the channels are used by the experiments. Word 33 has no self-contained data sync and parameter identification is by reading the 90-channel frame counter in ALSEP Word 3.

1st bit downlinked

	MSB									
BIT NO	1	2	3	4	5	6	7	8	9	10
CONTENT	0	0	Digital Analog Housekeeping Data							

1.4.1.2.4 CONT PARAMETER LISTING

DOWNLINK LISTING COLUMN HEADERS

- Col. 1 Experiment name.
- Col. 2 Measurement number. (An asterisk indicates that the word is sub-commmed)
- Col. 3 Measurement name.
- Col. 4 ALSEP main frame (1-64) word. An asterisk in this column indicates that experiment's words are asynchronous with respect to the ALSEP main frame word.
- Col. 5 ALSEP frame. The ALSEP frame number as read from the ALSEP frame counter in ALSEP word 3. The ALSEP frame counter counts from 1-89, and then to 0, which represents 90. Columns 46-48 may contain one of the following words:
- ALL = All ALSEP main frames
EVN = Even numbered ALSEP main frames
ODD = Odd numbered ALSEP main frames.
- An asterisk in this column indicates that this parameter is asynchronous with respect to the ALSEP frame.
- Col. 6 Bits. Indicates which of the ten bits (1-10) of an ALSEP or experiment word contain the measurement number given in column 2.
- Col. 7 Samples per Main Frame (S/MF). Indicates how often (on the average) a parameter appears in the ALSEP main frame.

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD	FRM	BITS	S/MF
CONT	DA-1A	SYNC (1110001001)	1	ALL	1-10	1
CONT	DA-1B	SYNC (0000111011)	2	ALL	1-10	1
CONT	DA-1C	SYNC (01)	3	ALL	1-2	1
CONT	DA-2	FRAME COUNTER (1-89,0)	3	ALL	3-9	1
CONT	DA-3A	MODE,BIT RATE ID (1=NORMAL)	3	1	10	1/90
CONT	DA-3B	MODE,BIT RATE ID (1=SLOW)	3	2	10	1/90
CONT	DA-4A	MODE,ALSEP ID (1) (MSB)	3	3	10	1/90
CONT	DA-4B	MODE,ALSEP ID (1)	3	4	10	1/90
CONT	DA-4C	MODE,ALSEP ID (0) (LSB)	3	5	10	1/90
CONT		MODE,FILL ZERO	3	6-0	10	85/90
CONT	DA-7	FILL ZEROS	33	ALL	1-2	1
CONT	AE-3	CONV INPUT VOLT.	33	1	3-10	1/90
CONT	AE-1	ADC CAL 0.25V	33	2	3-10	1/90
CONT	AE-2	ADC CAL 4.75V	33	3	3-10	1/90
CONT	AT-3	THERMAL PLATE-1 TEMP	33	4	3-10	1/90
CONT	AE-4	CONV INPUT CUR	33	5	3-10	1/90
CONT	AR-1	HOT FRAME-1 TEMP	33	6	3-10	1/90
CONT	AR-4	COLD FRAME-1 TEMP	33	7	3-10	1/90
CONT	AE-5	SHUNT REG-1 CUR	33	8	3-10	1/90
CONT	AB-1	RCVR.1KHZ SC PRES	33	9	3-10	1/90
CONT	AC-4	DC-DC CONVERTER VOLTAGE	33	10	3-10	1/90
CONT	AC-5	TEMP OF PHYSICAL ANALYZER	33	11	3-10	1/90
CONT	AL-4	PD, EXP # 1&2	33	12	3-10	1/90
CONT	AE-6	SHUNT REG-2 CUR	33	13	3-10	1/90
CONT	AB-5	PD, EXP # 3&4 & USS HTR 2	33	14	3-10	1/90
CONT	AT-10	BOTTOM STRUCTURE-3 TEMP	33	15	3-10	1/90
CONT	AT-21	LOCAL OSC. CRYSTAL A TEMP	33	16	3-10	1/90
CONT	AT-22	LOCAL OSC. CRYSTAL B TEMP	33	17	3-10	1/90
CONT	AT-23	XMTR A CRYSTAL TEMP	33	18	3-10	1/90
CONT	AT-24	XMTR A HEAT SINK TEMP	33	19	3-10	1/90
CONT	AE-7	PCU OUT VOLT-1(29V)	33	20	3-10	1/90
CONT	AE-13	RCVR.PRE-LIMIT. LEV	33	21	3-10	1/90
CONT	AE-18	XMTR. B,DC, PD	33	22	3-10	1/90
CONT	AL-1	L.P.AMPL.GAIN(X&Y)	33	23	3-10	1/90

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD FRM	BITS	S/MF
CONT	AL-5	LEV.MODE&CRS.SENS.MODE	33	24 3-10	1/90
CONT	AC-1	SWITCHABLE P.S. VOLTAGE	33	25 3-10	1/90
CONT	AX-5	2 CELL OUTPUT	33	26 3-10	1/90
CONT	AT-1	SOLAR PANEL-LEFT-SIDE 1	33	27 3-10	1/90
CONT	AT-4	THERMAL PLATE-2 TEMP	33	28 3-10	1/90
CONT	AS-1	CENTRAL STATION PACK. TEMP	33	29 3-10	1/90
CONT	AX-2	2 CELL TEMP	33	30 3-10	1/90
CONT	AI-25	XMTR B CRYSTAL TEMP	33	31 3-10	1/90
CONT	AT-26	XMTR B HEAT SINK TEMP	33	32 3-10	1/90
CONT	AT-27	ANALOG DP, BASE TEMP	33	33 3-10	1/90
CONT	AI-28	ANALOG DP, INT TEMP	33	34 3-10	1/90
CONT	AE-8	PCU OUT VOLT-2(15V)	33	35 3-10	1/90
CONT	AE-14	RCVR.LOCAL OSC LEV	33	36 3-10	1/90
CONT	AR-2	HOT FRAME #2	33	37 3-10	1/90
CONT	AL-2	L.P.AMPL.GAIN(Z)	33	38 3-10	1/90
CONT	AL-6	THERM.CTL.STAT.	33	39 3-10	1/90
CONT	AC-3	CHANNELTRON P.S. #2	33	40 3-10	1/90
CONT	AX-6	3 CELL OUTPUT	33	41 3-10	1/90
CONT	AT-2	SOLAR PANEL-RIGHT-SIDE 2	33	42 3-10	1/90
CONT	AT-5	THERMAL PLATE-3 TEMP	33	43 3-10	1/90
CONT	AS-2	MORTAR BOX TEMP	33	44 3-10	1/90
CONT		UNASSIGNED	33	45 3-10	
CONT	AT-29	DIGITAL DP, BASE TEMP	33	46 3-10	1/90
CONT	AT-30	DIGITAL DP, INT TEMP	33	47 3-10	1/90
CONT	AT-31	CMD DECODER, BASE TEMP	33	48 3-10	1/90
CONT	AT-32	CMD DECODER, INT TEMP	33	49 3-10	1/90
CONT	AE-9	PCU OUT VOLT-3(12V)	33	50 3-10	1/90
CONT	AE-15	XMTR. A, AGC VOLT	33	51 3-10	1/90
CONT	AR-3	HOT FRAME-3 TEMP	33	52 3-10	1/90
CONT	AL-3	LEV.DIR&SPEED	33	53 3-10	1/90
CONT	AL-7	CAL.STAT.L.P.&S.P.	33	54 3-10	1/90
CONT	AS-3	GRENADE LAUNCHER TEMP	33	55 3-10	1/90
CONT	AX-3	3 CELL TEMP	33	56 3-10	1/90
CONT		UNASSIGNED	33	57 3-10	
CONT	AT-6	THERMAL PLATE-4 TEMP	33	58 3-10	1/90

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD	FRM	BITS	S/MF
CONT	AT-8	LEFT SIDE STRUCTURE-1 TEMP	33	59	3-10	1/90
CONT	AT-12	INNER MULTILAYER INS TEMP	33	60	3-10	1/90
CONT	AT-33	CMD DEMOD VCO TEMP	33	61	3-10	1/90
CONT	AT-34	PDU, BASE TEMP	33	62	3-10	1/90
CONT	AT-35	PDU, INT TEMP	33	63	3-10	1/90
CONT	AT-36	PCU, POWER OSC-1 TEMP	33	64	3-10	1/90
CONT	AE-10	PCU OUT VOLT-4(5V)	33	65	3-10	1/90
CONT	AE-16	XMTR. B AGC VOLT	33	66	3-10	1/90
CONT	AR-5	COLD FRAME-2 TEMP	33	67	3-10	1/90
CONT	AL-4	S.P.AMPL.GAIN(Z)	33	68	3-10	1/90
CONT	AL-8	UNCAGE STATUS	33	69	3-10	1/90
CONT	AI-1	LOW ENG DETECT CT,RT	33	70	3-10	1/90
CONT	AT-7	THERMAL PLATE-5 TEMP	33	71	3-10	1/90
CONT	AT-13	OUTER MULTILAYER INS TEMP	33	72	3-10	1/90
CONT	AS-4	GEOPHONE TEMP	33	73	3-10	1/90
CONT		UNASSIGNED	33	74	3-10	
CONT		UNASSIGNED	33	75	3-10	
CONT	AT-37	PCU, POWER OSC-2 TEMP	33	76	3-10	1/90
CONT	AT-38	PCU, REGULATOR-1 TEMP	33	77	3-10	1/90
CONT	AT-39	PCU, REGULATOR-2 TEMP	33	78	3-10	1/90
CONT	AE-11	PCU, OUT VOLT-5(-12V)	33	79	3-10	1/90
CONT	AE-12	PCU, OUT VOLT-6(-6V))	33	80	3-10	1/90
CONT	AE-17	XMTR. A,DC, PD	33	81	3-10	1/90
CONT	AR-6	COLD FRAME #6	33	82	3-10	1/90
CONT	AX-1	1 CELL TEMP	33	83	3-10	1/90
CONT	AX-4	1 CELL OUTPUT	33	84	3-10	1/90
CONT	AI-2	HI ENG DETECT CT,RT	33	85	3-10	1/90
CONT		UNASSIGNED	33	86	3-10	
CONT	AT-9	RIGHT SIDE STRUCTURE-2 TEMP	33	87	3-10	1/90
CONT	AT-11	BACK STRUCTURE-4 TEMP	33	88	3-10	1/90
CONT	AC-2	CHANNELTRON P.S. #1	33	89	3-10	1/90
CONT	AC-6	TEMP OF SWITCHABLE P.S.	33	0	3-10	1/90
CONT	DA-7	FILL ZEROS	05	ALL	1-2	1
CONT	DA-5	RECVD CMD MESSAGE	05	ALL	3-9	1
CONT	DA-6	CMD MAP	05	ALL	10	1

1.4.1.3 PASSIVE SEISMIC EXPERIMENT (PSE)

1.4.1.3.1 PSE DOWNLINK DESCRIPTION

Scientific Measurements

8 PSE scientific parameters are output in 44 ALSEP main frame words. The PSE words are 10-bits of digital converted analog data.

S.P. Z-axis data is supercommutated into 30 of the main frame words.

L.P. X-axis data, L.P. Y-axis data, and L.P. Z-axis data are supercommutated into 4 main frame words each (total of 12 main frame words).

Two main frame words, 35 and 37, contain 2-channel subcommutators. Content of the main frame words is identified by the LSB of the 90-channel frame counter in ALSEP Word 3, as follows:

LSB	ALSEP FRAME	ALSEP WORD	CONTENT
"0"	Even	35	Tidal X-Axis
"0"	Even	37	Tidal Y-Axis
"1"	Odd	35	Tidal Z-Axis
"1"	Odd	37	Sensor Unit Temp

Engineering Status

There are 8 parameters of 8-bit housekeeping data which are read out in ALSEP Word 33.

1.4.1.3.2 PSE PARAMETER LISTING

DOWNLINK LISTINGS COLUMN HEADERS

- Col. 1 Experiment name.
- Col. 2 Measurement number. (An asterisk in col. 11 indicates that the word is subcommed)
- Col. 3 Measurement name.
- Col. 4 ALSEP main frame (1-64) word. An asterisk in this column indicates that experiment's words are asynchronous with respect to the ALSEP main frame word.
- Col. 5 ALSEP frame. The ALSEP frame number as read from the ALSEP frame counter in ALSEP word 3. The ALSEP frame counter counts from 1-89, and then to 0, which represents 90. Columns 46-48 may contain one of the following words:
- ALL = ALL ALSEP main frames.
 - EVN = Even numbered ALSEP main frames.
 - ODD = Odd numbered ALSEP main frames.
- An asterisk in this column indicates that this parameter is asynchronous with respect to the ALSEP frames.
- Col. 6 Bits. Indicates which of the ten or twenty bits of an ALSEP (1-10) or experiment (1-10 or 1-20) word contain the measurement number given in columns 7-11.
- Col. 7 Samples per Main Frame (S/MF). Indicates how often (on the average) a parameter appears in the ALSEP main frame.
- Col. 8 Experiment word. For the SIDE these columns indicate the SIDE word number (1-5)
For the CPLEE these columns indicate the CPLEE word number (1-32)
- Col. 9 Experiment Frame. For the side these columns indicate the SIDE frame number (0-127)
- Col. 10 Flag bits

EXP NAME	MEAS NO	MEAS NAME	ALSEP			EXPERIMENT		
			WD	FRM	BITS	S/MF	WD	FRAME
PSE	DL-8	SP SEISMIC Z	4	ALL	1-10	30		
PSE	DL-8	SP SEISMIC Z	6	ALL	1-10	30		
PSE	DL-8	SP SEISMIC Z	8	ALL	1-10	30		
PSE	DL-1	LP SEISMIC X	9	ALL	1-10	4		
PSE	DL-8	SP SEISMIC Z	10	ALL	1-10	30		
PSE	DL-2	LP SEISMIC Y	11	ALL	1-10	4		
PSE	DL-8	SP SEISMIC Z	12	ALL	1-10	30		
PSE	DL-3	LP SEISMIC Z	13	ALL	1-10	4		
PSE	DL-8	SP SEISMIC Z	14	ALL	1-10	30		
PSE	DL-8	SP SEISMIC Z	16	ALL	1-10	30		
PSE	DL-8	SP SEISMIC Z	18	ALL	1-10	30		
PSE	DL-8	SP SEISMIC Z	20	ALL	1-10	30		
PSE	DL-8	SP SEISMIC Z	22	ALL	1-10	30		
PSE	DL-8	SP SEISMIC Z	24	ALL	1-10	30		
PSE	DL-1	LP SEISMIC X	25	ALL	1-10	4		
PSE	DL-8	SP SEISMIC Z	26	ALL	1-10	30		
PSE	DL-2	LP SEISMIC Y	27	ALL	1-10	4		
PSE	DL-8	SP SEISMIC Z	28	ALL	1-10	30		
PSE	DL-3	LP SEISMIC Z	29	ALL	1-10	4		
PSE	DL-8	SP SEISMIC Z	30	ALL	1-10	30		
PSE	DL-8	SP SEISMIC Z	32	ALL	1-10	30		
PSE	DL-8	SP SEISMIC Z	34	ALL	1-10	30		
PSE	DL-4	TIDAL X	35	EVN	1-10	1/2		
PSE	DL-6	TIDAL Z	35	ODD	1-10	1/2		
PSE	DL-8	SP SEISMIC Z	36	ALL	1-10	30		
PSE	DL-5	TIDAL Y	37	EVN	1-10	1/2		
PSE	DL-7	SENSOR UNIT TEMP	37	ODD	1-10	1/2		
PSE	DL-8	SP SEISMIC Z	38	ALL	1-10	30		
PSE	DL-8	SP SEISMIC Z	40	ALL	1-10	30		
PSE	DL-1	LP SEISMIC X	41	ALL	1-10	4		
PSE	DL-8	SP SEISMIC Z	42	ALL	1-10	30		
PSE	DL-2	LP SEISMIC Y	43	ALL	1-10	4		
PSE	DL-8	SP SEISMIC Z	44	ALL	1-10	30		
PSE	DL-3	LP SEISMIC Z	45	ALL	1-10	4		
PSE	DL-8	SP SEISMIC Z	46	ALL	1-10	30		
PSE	DL-8	SP SEISMIC Z	48	ALL	1-10	30		
PSE	DL-8	SP SEISMIC Z	50	ALL	1-10	30		
PSE	DL-8	SP SEISMIC Z	52	ALL	1-10	30		
PSE	DL-8	SP SEISMIC Z	54	ALL	1-10	30		
PSE	DL-1	LP SEISMIC X	57	ALL	1-10	4		
PSE	DL-8	SP SEISMIC Z	58	ALL	1-10	30		
PSE	DL-2	LP SEISMIC Y	59	ALL	1-10	4		
PSE	DL-8	SP SEISMIC Z	60	ALL	1-10	30		
PSE	DL-3	LP SEISMIC Z	61	ALL	1-10	4		
PSE	DL-8	SP SEISMIC Z	62	ALL	1-10	30		
PSE	DL-8	SP SEISMIC Z	64	ALL	1-10	30		

1.4.1.4 CHARGED PARTICLE LUNAR ENVIRONMENT EXPERIMENT (CPLEE)

1.4.1.4.1 CPLEE DOWNLINK DESCRIPTION

The CPLEE is allotted words 7, 17, 19, 23, 39 and 55 in the ALSEP main frame. Each of these words is subcommutated into two subwords. These subwords are identified as "ODD" or "EVN" according to the value of bit 9 of the ALSEP 90 channel frame counter (ALSEP word 3). Each of the subwords is in turn subcommutated into two sub-subwords which are designated "ODD" or "EVN" in the manner described above. This subcommutation yields 24 10-bit CPLEE channels.

The 24 10-bit CPLEE channels read out digital values of 12 particle detectors designated 1-A through 6-A and 1-B through 6-B. Data from detector 1-A is read out into channels 1 and 2, detector 2-A into channels 3 and 4, etc. Eight of these detectors (1-A through 4-A, and 1-B through 4-B) have 19 bit readouts. The remaining detectors have 20 bit readouts. The basic CPLEE format is shown below.

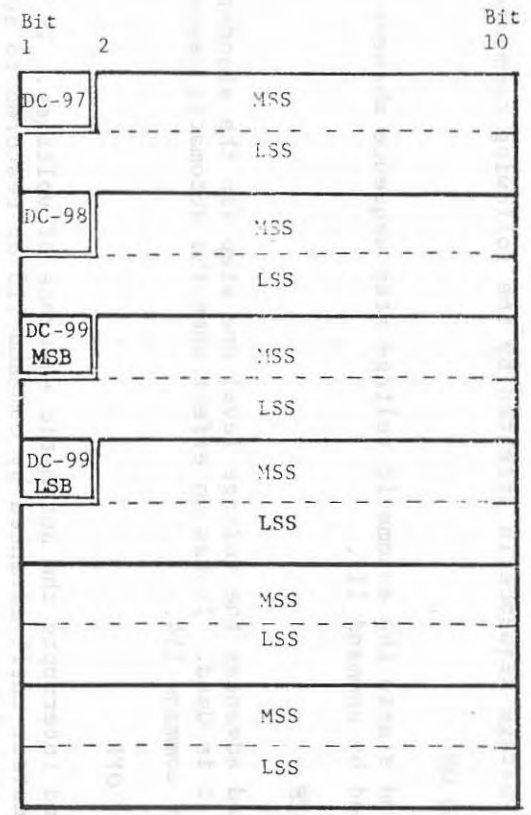
- DC-97 Physical Analyzer ID "1" = A
"0" = B
- DC-98 Polarity of Deflection "1" = +
Voltage ID "0" = -

	DC-99 is in	MSB-WD39 EVN	WD39 EVN	WD07 ODD	Deflection Voltage
The MSB of	DC-99 is in	MSB-WD39 EVN	WD39 EVN	WD07 ODD	Deflection Voltage
The LSB of	DC-99 is in	MSB-WD07 ODD	1	1	3500
			1	0	350
			0	1	35
			0	0	0

<u>ALSEP WORD</u>	<u>ALSEP FRAME</u>	<u>CHANNEL</u>	<u>DET.</u>	<u>ANALYZER</u>
7	EVN	1	1	A
17	EVN	2		
19	EVN	3	2	A
23	EVN	4		
39	EVN	5	3	A
55	EVN	6		
7	ODD	7	4	A
17	ODD	8		
19	ODD	9	5	A
23	ODD	10		
39	ODD	11	6	A
55	ODD	12		

1.4-16

B-17



13
↓
24

CHANNELS 1 TO 12 ARE REPEATED FOR CHANNELS 13 TO 24 BUT FOR ANALYZER B DETECTORS 1-6 WITH THE SAME DEFLECTION PLATE VOLTAGE.

Since each voltage (one of four) can be either + or -, there are eight voltages that the CPLEE steps through. The CPLEE may initialize at any step voltage, but must always start with analyzer A detector 1. A complete CPLEE cycle requires 32 ALSEP main frames.

The CPLEE voltage sequence is affected by the following commands:

114 CPE DEF SEQ ON

This command starts the automatic voltage step sequence whenever it has been stopped by command 117.

115 CPE DEF STEP

This command advances the voltage level one step (in the standard sequence) each time it is used. It has no effect when the automatic sequence has been selected by command 114.

117 CPE DEF SEQ OFF

This command interrupts the automatic sequence of voltages. The voltage then remains constant until advanced by command 115 or restored to automatic sequence by command 114.

1.4.1.4.2 CPLEE PARAMETER LISTING

DOWNLINK LISTINGS COLUMN HEADERS

- Col. 1 Experiment name.
- Col. 2 Measurement number. (An asterisk in col. 11 indicates that the word is subcommand)
- Col. 3 Measurement name.
- Col. 4 ALSEP main frame (1-64) word. An asterisk in this column indicates that experiment's words are asynchronous with respect to the ALSEP main frame word.
- Col. 5 ALSEP frame. The ALSEP frame number as read from the ALSEP frame counter in ALSEP word 3. The ALSEP frame counter counts from 1-89, and then to 0, which represents 90. Columns 46-48 may contain one of the following words:
 ALL = ALL ALSEP main frames.
 EVN = Even numbered ALSEP main frames.
 ODD = Odd numbered ALSEP main frames.
- An asterisk in this column indicates that this parameter is asynchronous with respect to the ALSEP frames.
- Col. 6 Bits. Indicates which of the ten or twenty bits of an ALSEP (1-10) or experiment (1-10 or 1-20) word contain the measurement number given in columns 7-11.
- Col. 7 Samples per Main Frame (S/MF). Indicates how often (on the average) a parameter appears in the ALSEP main frame.
- Col. 8 Experiment word. For the SIDE these columns indicate the SIDE word number (1-5)
 For the CPLEE these columns indicate the CPLEE word number (1-32)
- Col. 9 Experiment Frame. For the side these columns indicate the SIDE frame number (0-127)
- Col. 10 Flag bits

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD	FRM	BITS	S/MF	CPLD WD	CPLD FRAME
CPLD	DC-97	PHYSICAL ANALYZER ID	7	EVN	1	1/2		
CPLD	DC-98	POLARITY DEFLECTION VOLT ID	19	EVN	1	1/2		
CPLD	DC-99	DEFLECTION VOLTAGE LEVEL ID	7	ODD	1	1/2		
CPLD	DC-99	DEFLECTION VOLTAGE LEVEL ID	39	EVN	1	1/2		
CPLD	DC-1	DET. 1-A +3500V	7	EVN	9	1/32		1
CPLD	DC-1	DET. 1-A +3500V	17	EVN	10	1/32		1
CPLD	DC-2	DET. 2-A +3500V	19	EVN	9	1/32		1
CPLD	DC-2	DET. 2-A +3500V	23	EVN	10	1/32		1
CPLD	DC-3	DET. 3-A +3500V	39	EVN	9	1/32		1
CPLD	DC-3	DET. 3-A +3500V	55	EVN	10	1/32		1
CPLD	DC-4	DET. 4-A +3500V	7	ODD	9	1/32		2
CPLD	DC-4	DET. 4-A +3500V	17	ODD	10	1/32		2
CPLD	DC-5	DET. 5-A +3500V	19	ODD	10	1/32		2
CPLD	DC-5	DET. 5-A +3500V	23	ODD	10	1/32		2
CPLD	DC-6	DET. 6-A +3500V	39	ODD	10	1/32		2
CPLD	DC-6	DET. 6-A +3500V	55	ODD	10	1/32		2
CPLD	DC-7	DET. 1-B +3500V	7	EVN	9	1/32		3
CPLD	DC-7	DET. 1-B +3500V	17	EVN	10	1/32		3
CPLD	DC-8	DET. 2-B +3500V	19	EVN	9	1/32		3
CPLD	DC-8	DET. 2-B +3500V	23	EVN	10	1/32		3
CPLD	DC-9	DET. 3-B +3500V	39	EVN	9	1/32		3
CPLD	DC-9	DET. 3-B +3500V	55	EVN	10	1/32		3
CPLD	DC-10	DET. 4-B +3500V	7	ODD	9	1/32		4
CPLD	DC-10	DET. 4-B +3500V	17	ODD	10	1/32		4
CPLD	DC-11	DET. 5-B +3500V	19	ODD	10	1/32		4
CPLD	DC-11	DET. 5-B +3500V	23	ODD	10	1/32		4
CPLD	DC-12	DET. 6-B +3500V	39	ODD	10	1/32		4
CPLD	DC-12	DET. 6-B +3500V	55	ODD	10	1/32		4
CPLD	DC-13	DET. 1-A +350V	7	EVN	9	1/32		5
CPLD	DC-13	DET. 1-A +350V	17	EVN	10	1/32		5
CPLD	DC-14	DET. 2-A +350V	19	EVN	9	1/32		5
CPLD	DC-14	DET. 2-A +350V	23	EVN	10	1/32		5
CPLD	DC-15	DET. 3-A +350V	39	EVN	9	1/32		5
CPLD	DC-15	DET. 3-A +350V	55	EVN	10	1/32		5
CPLD	DC-16	DET. 4-A +350V	7	ODD	9	1/32		6
CPLD	DC-16	DET. 4-A +350V	17	ODD	10	1/32		6
CPLD	DC-17	DET. 5-A +350V	19	ODD	10	1/32		6
CPLD	DC-17	DET. 5-A +350V	23	ODD	10	1/32		6
CPLD	DC-18	DET. 6-A +350V	39	ODD	10	1/32		6
CPLD	DC-18	DET. 6-A +350V	55	ODD	10	1/32		6

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD	FRM	BITS	S/MF	CPLD WD	CPLD FRAME
CPLD	DC-19	DET. 1-B +350V	7	EVN	9	1/32		7
CPLD	DC-19	DET. 1-B +350V	17	EVN	10	1/32		7
CPLD	DC-20	DET. 2-B +350V	19	EVN	9	1/32		7
CPLD	DC-20	DET. 2-B +350V	23	EVN	10	1/32		7
CPLD	DC-21	DET. 3-B +350V	39	EVN	9	1/32		7
CPLD	DC-21	DET. 3-B +350V	55	EVN	10	1/32		7
CPLD	DC-22	DET. 4-B +350V	7	ODD	9	1/32		8
CPLD	DC-22	DET. 4-B +350V	17	ODD	10	1/32		8
CPLD	DC-23	DET. 5-B +350V	19	ODD	10	1/32		8
CPLD	DC-23	DET. 5-B +350V	23	ODD	10	1/32		8
CPLD	DC-24	DET. 6-B +350V	39	ODD	10	1/32		8
CPLD	DC-24	DET. 6-B +350V	55	ODD	10	1/32		8
CPLD	DC-25	DET. 1-A +35V	7	EVN	9	1/32		9
CPLD	DC-25	DET. 1-A +35V	17	EVN	10	1/32		9
CPLD	DC-26	DET. 2-A +35V	19	EVN	9	1/32		9
CPLD	DC-26	DET. 2-A +35V	23	EVN	10	1/32		9
CPLD	DC-27	DET. 3-A +35V	39	EVN	9	1/32		9
CPLD	DC-27	DET. 3-A +35V	55	EVN	10	1/32		9
CPLD	DC-28	DET. 4-A +35V	7	ODD	9	1/32		10
CPLD	DC-28	DET. 4-A +35V	17	ODD	10	1/32		10
CPLD	DC-29	DET. 5-A +35V	19	ODD	10	1/32		10
CPLD	DC-29	DET. 5-A +35V	23	ODD	10	1/32		10
CPLD	DC-30	DET. 6-A +35V	39	ODD	10	1/32		10
CPLD	DC-30	DET. 6-A +35V	55	ODD	10	1/32		10
CPLD	DC-31	DET. 1-B +35V	7	EVN	9	1/32		11
CPLD	DC-31	DET. 1-B +35V	17	EVN	10	1/32		11
CPLD	DC-32	DET. 2-B +35V	19	EVN	9	1/32		11
CPLD	DC-32	DET. 2-B +35V	23	EVN	10	1/32		11
CPLD	DC-33	DET. 3-B +35V	39	EVN	9	1/32		11
CPLD	DC-33	DET. 3-B +35V	55	EVN	10	1/32		11
CPLD	DC-34	DET. 4-B +35V	7	ODD	9	1/32		12
CPLD	DC-34	DET. 4-B +35V	17	ODD	10	1/32		12
CPLD	DC-35	DET. 5-B +35V	19	ODD	10	1/32		12
CPLD	DC-35	DET. 5-B +35V	23	ODD	10	1/32		12
CPLD	DC-36	DET. 6-B +35V	39	ODD	10	1/32		12
CPLD	DC-36	DET. 6-B +35V	55	ODD	10	1/32		12

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD	FRM	BITS	S/MF	CPLD WD	CPLD FRAME
CPLD	DC-37	DET. 1-A +0V	7	EVN	9	1/32		13
CPLD	DC-37	DET. 1-A +0V	17	EVN	10	1/32		13
CPLD	DC-38	DET. 2-A +0V	19	EVN	9	1/32		13
CPLD	DC-38	DET. 2-A +0V	23	EVN	10	1/32		13
CPLD	DC-39	DET. 3-A +0V	39	EVN	9	1/32		13
CPLD	DC-39	DET. 3-A +0V	55	EVN	10	1/32		13
CPLD	DC-40	DET. 4-A +0V	7	ODD	9	1/32		14
CPLD	DC-40	DET. 4-A +0V	17	ODD	10	1/32		14
CPLD	DC-41	DET. 5-A +0V	19	ODD	10	1/32		14
CPLD	DC-41	DET. 5-A +0V	23	ODD	10	1/32		14
CPLD	DC-42	DET. 6-A +0V	39	ODD	10	1/32		14
CPLD	DC-42	DET. 6-A +0V	55	ODD	10	1/32		14
CPLD	DC-43	DET. 1-B +0V	7	EVN	9	1/32		15
CPLD	DC-43	DET. 1-B +0V	17	EVN	10	1/32		15
CPLD	DC-44	DET. 2-B +0V	19	EVN	9	1/32		15
CPLD	DC-44	DET. 2-B +0V	23	EVN	10	1/32		15
CPLD	DC-45	DET. 3-B +0V	39	EVN	9	1/32		15
CPLD	DC-45	DET. 3-B +0V	55	EVN	10	1/32		15
CPLD	DC-46	DET. 4-B +0V	7	ODD	9	1/32		16
CPLD	DC-46	DET. 4-B +0V	17	ODD	10	1/32		16
CPLD	DC-47	DET. 5-B +0V	19	ODD	10	1/32		16
CPLD	DC-47	DET. 5-B +0V	23	ODD	10	1/32		16
CPLD	DC-48	DET. 6-B +0V	39	ODD	10	1/32		16
CPLD	DC-48	DET. 6-B +0V	55	ODD	10	1/32		16
CPLD	DC-49	DET. 1-A -3500V	7	EVN	9	1/32		17
CPLD	DC-49	DET. 1-A -3500V	17	EVN	10	1/32		17
CPLD	DC-50	DET. 2-A -3500V	19	EVN	9	1/32		17
CPLD	DC-50	DET. 2-A -3500V	23	EVN	10	1/32		17
CPLD	DC-51	DET. 3-A -3500V	39	EVN	9	1/32		17
CPLD	DC-51	DET. 3-A -3500V	55	EVN	10	1/32		17
CPLD	DC-52	DET. 4-A -3500V	7	ODD	9	1/32		18
CPLD	DC-52	DET. 4-A -3500V	17	ODD	10	1/32		18
CPLD	DC-53	DET. 5-A -3500V	19	ODD	10	1/32		18
CPLD	DC-53	DET. 5-A -3500V	23	ODD	10	1/32		18
CPLD	DC-54	DET. 6-A -3500V	39	ODD	10	1/32		18
CPLD	DC-54	DET. 6-A -3500V	55	ODD	10	1/32		18

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD FRM	BITS	S/MF	CPLD WD	CPLD FRAME
CPLD	DC-55	DET. 1-B -3500V	7	EVN	9	1/32	19
CPLD	DC-55	DET. 1-B -3500V	17	EVN	10	1/32	19
CPLD	DC-56	DET. 2-B -3500V	19	EVN	9	1/32	19
CPLD	DC-56	DET. 2-B -3500V	23	EVN	10	1/32	19
CPLD	DC-57	DET. 3-B -3500V	39	EVN	9	1/32	19
CPLD	DC-57	DET. 3-B -3500V	55	EVN	10	1/32	19
CPLD	DC-58	DET. 4-B -3500V	7	ODD	9	1/32	20
CPLD	DC-58	DET. 4-B -3500V	17	ODD	10	1/32	20
CPLD	DC-59	DET. 5-B -3500V	19	ODD	10	1/32	20
CPLD	DC-59	DET. 5-B -3500V	23	ODD	10	1/32	20
CPLD	DC-60	DET. 6-B -3500V	39	ODD	10	1/32	20
CPLD	DC-60	DET. 6-B -3500V	55	ODD	10	1/32	20
CPLD	DC-61	DET. 1-A -350V	7	EVN	9	1/32	21
CPLD	DC-61	DET. 1-A -350V	17	EVN	10	1/32	21
CPLD	DC-62	DET. 2-A -350V	19	EVN	9	1/32	21
CPLD	DC-62	DET. 2-A -350V	23	EVN	10	1/32	21
CPLD	DC-63	DET. 3-A -350V	39	EVN	9	1/32	21
CPLD	DC-63	DET. 3-A -350V	55	EVN	10	1/32	21
CPLD	DC-64	DET. 4-A -350V	7	ODD	9	1/32	22
CPLD	DC-64	DET. 4-A -350V	17	ODD	10	1/32	22
CPLD	DC-65	DET. 5-A -350V	19	ODD	10	1/32	22
CPLD	DC-65	DET. 5-A -350V	23	ODD	10	1/32	22
CPLD	DC-66	DET. 6-A -350V	39	ODD	10	1/32	22
CPLD	DC-66	DET. 6-A -350V	55	ODD	10	1/32	22
CPLD	DC-67	DET. 1-B -350V	7	EVN	9	1/32	23
CPLD	DC-67	DET. 1-B -350V	17	EVN	10	1/32	23
CPLD	DC-68	DET. 2-B -350V	19	EVN	9	1/32	23
CPLD	DC-68	DET. 2-B -350V	23	EVN	10	1/32	23
CPLD	DC-69	DET. 3-B -350V	39	EVN	9	1/32	23
CPLD	DC-69	DET. 3-B -350V	55	EVN	10	1/32	23
CPLD	DC-70	DET. 4-B -350V	7	ODD	9	1/32	24
CPLD	DC-70	DET. 4-B -350V	17	ODD	10	1/32	24
CPLD	DC-71	DET. 5-B -350V	19	ODD	10	1/32	24
CPLD	DC-71	DET. 5-B -350V	23	ODD	10	1/32	24
CPLD	DC-72	DET. 6-B -350V	39	ODD	10	1/32	24
CPLD	DC-72	DET. 6-B -350V	55	ODD	10	1/32	24

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD FRM BITS	S/MF	CPLD WD	CPLD FRAME
CPLD	DC-73	DET. 1-A -35V	7 EVN	9	1/32	25
CPLD	DC-73	DET. 1-A -35V	17 EVN	10	1/32	25
CPLD	DC-74	DET. 2-A -35V	19 EVN	9	1/32	25
CPLD	DC-74	DET. 2-A -35V	23 EVN	10	1/32	25
CPLD	DC-75	DET. 3-A -35V	39 EVN	9	1/32	25
CPLD	DC-75	DET. 3-A -35V	55 EVN	10	1/32	25
CPLD	DC-76	DET. 4-A -35V	7 ODD	9	1/32	26
CPLD	DC-76	DET. 4-A -35V	17 ODD	10	1/32	26
CPLD	DC-77	DET. 5-A -35V	19 ODD	10	1/32	26
CPLD	DC-77	DET. 5-A -35V	23 ODD	10	1/32	26
CPLD	DC-78	DET. 6-A -35V	39 ODD	10	1/32	26
CPLD	DC-78	DET. 6-A -35V	55 ODD	10	1/32	26
CPLD	DC-79	DET. 1-B -35V	7 EVN	9	1/32	27
CPLD	DC-79	DET. 1-B -35V	17 EVN	10	1/32	27
CPLD	DC-80	DET. 2-B -35V	19 EVN	9	1/32	27
CPLD	DC-80	DET. 2-B -35V	23 EVN	10	1/32	27
CPLD	DC-81	DET. 3-B -35V	39 EVN	9	1/32	27
CPLD	DC-81	DET. 3-B -35V	55 EVN	10	1/32	27
CPLD	DC-82	DET. 4-B -35V	7 ODD	9	1/32	28
CPLD	DC-82	DET. 4-B -35V	17 ODD	10	1/32	28
CPLD	DC-83	DET. 5-B -35V	19 ODD	10	1/32	28
CPLD	DC-83	DET. 5-B -35V	23 ODD	10	1/32	28
CPLD	DC-84	DET. 6-B -35V	39 ODD	10	1/32	28
CPLD	DC-84	DET. 6-B -35V	55 ODD	10	1/32	28
CPLD	DC-85	DET. 1-A -0V	7 EVN	9	1/32	29
CPLD	DC-85	DET. 1-A -0V	17 EVN	10	1/32	29
CPLD	DC-86	DET. 2-A -0V	19 EVN	9	1/32	29
CPLD	DC-86	DET. 2-A -0V	23 EVN	10	1/32	29
CPLD	DC-87	DET. 3-A -0V	39 EVN	9	1/32	29
CPLD	DC-87	DET. 3-A -0V	55 EVN	10	1/32	29
CPLD	DC-88	DET. 4-A -0V	7 ODD	9	1/32	30
CPLD	DC-88	DET. 4-A -0V	17 ODD	10	1/32	30
CPLD	DC-89	DET. 5-A -0V	19 ODD	10	1/32	30
CPLD	DC-89	DET. 5-A -0V	23 ODD	10	1/32	30
CPLD	DC-90	DET. 6-A -0V	39 ODD	10	1/32	30
CPLD	DC-90	DET. 6-A -0V	55 ODD	10	1/32	30

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD	FRM	BITS	S/MF	CPLE WD	CPLE FRAME
CPLE	DC-91	DET. 1-B -0V	7	EVN	9	1/32		31
CPLE	DC-91	DET. 1-B -0V	17	EVN	10	1/32		31
CPLE	DC-92	DET. 2-B -0V	19	EVN	9	1/32		31
CPLE	DC-92	DET. 2-B -0V	23	EVN	10	1/32		31
CPLE	DC-93	DET. 3-B -0V	39	EVN	9	1/32		31
CPLE	DC-93	DET. 3-B -0V	55	EVN	10	1/32		31
CPLE	DC-94	DET. 4-B -0V	7	ODD	9	1/32		32
CPLE	DC-94	DET. 4-B -0V	17	ODD	10	1/32		32
CPLE	DC-95	DET. 5-B -0V	19	ODD	10	1/32		32
CPLE	DC-95	DET. 5-B -0V	23	ODD	10	1/32		32
CPLE	DC-96	DET. 6-B -0V	39	ODD	10	1/32		32
CPLE	DC-96	DET. 6-B -0V	55	ODD	10	1/32		32

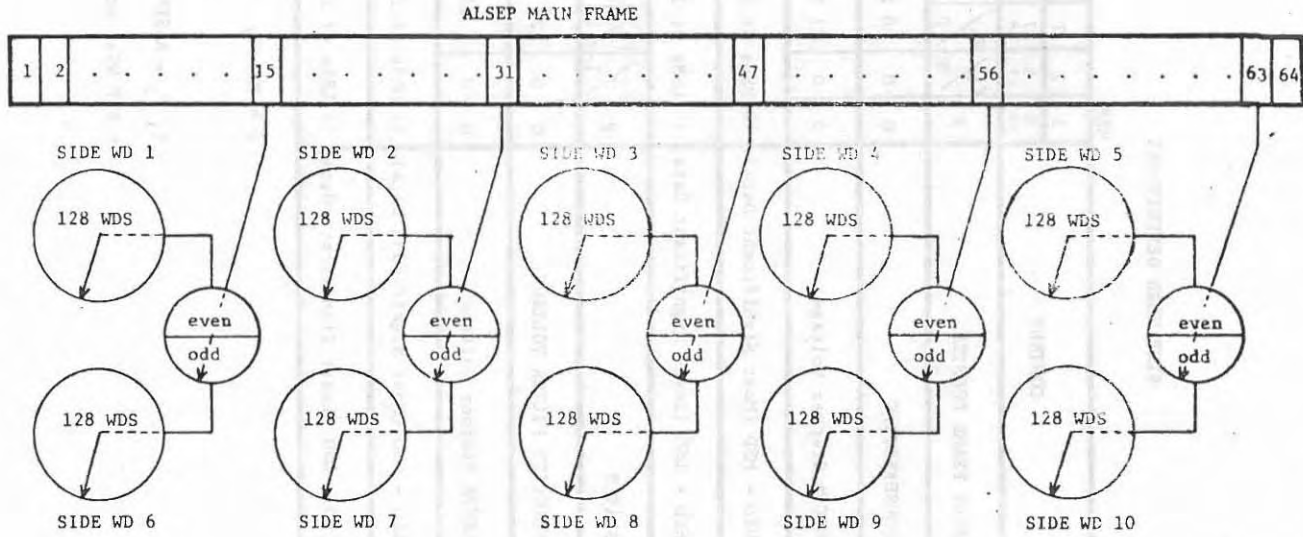
1.4.1.5 Suprathermal Ion Detector and Cold Cathode Gage Experiment (SIDE)

1.4.1.5.1 SIDE Downlink Description

SIDE uses 5 ALSEP main frame words: 15, 31, 47, 56 and 63. Each of the 5 ALSEP words is a two-channel subcommutator, each with a 128-channel sub-subcommutator. The output of the 5 two-channel subcommutator is designated by a SIDE word number of 1 thru 10. These 10 SIDE words constitute a SIDE frame. The SIDE word number that is read out in a particular ALSEP frame is determined by the contents of the LSB of the 90-channel frame counter in ALSEP Word 3. If the LSB is "0", which is EVEN, ALSEP Words 15, 31, 47, 56 and 63 read out SIDE Words 1 thru 5, respectively. If the LSB is "1", which is ODD, ALSEP Words 15, 31, 47, 56 and 63 read out SIDE Words 6 thru 10, respectively. SIDE words 1 and 6 contain bits which also define the ALSEP frame as being EVEN or ODD.

. 10 SIDE WORDS	=	1 SIDE FRAME	=	2 ALSEP MAIN FRAMES
. 128 SIDE FRAMES	=	1 SIDE CYCLE	=	256 ALSEP MAIN FRAMES
. 24 SIDE CYCLES	=	1 SIDE FIELD	=	6144 ALSEP MAIN FRAMES

ALSEP
WORD



SIDE WORD DEFINITIONS

ALSEP		SIDE WORD	CONTENT	MSB LSB									
WORD	FRAME			1	2	3	4	5	6	7	8	9	10
				9	8	7	6	5	4	3	2	1	0
				2*	2*	2*	2	2	2	2	2	2	2
15	EVEN	1	SIDE FRAME COUNTER	P	F ₁ 0	F ₂ 0	0-127 Frame Count						
31	EVEN	2	HOUSEKEEPING	0	0	30 Digitized Analogs							
47	EVEN	3	HECPA Stepper Voltage	0	0	21 Digitized Analogs							
56	EVEN	4	HED - MSD (Most Significant Data)	10 MSBs of 20 Bit Count			[0-999 Decimal]						
63	EVEN	5	HED - LSD (Least Significant Data)	10 LSBs of 20 Bit Count			[0-999 Decimal]						
15	ODD	6	STATUS	P	F ₁ 1	F ₂ 1	9 Digitals						
31	ODD	7	VELOCITY FILTER VOLTAGE	0	0	126 Digitized Analogs							
47	ODD	8	LECPA Stepper Voltage	0	0	7 Digitized Analogs							
56	ODD	9	LED - MSD (Most Significant Data)	10 MSBs of 20 Bit Count			[0-999 Decimal]						
63	ODD	10	LED - LSD (Least Significant Data)	10 LSBs of 20 Bit Count			[0-999 Decimal]						

1
SIDE
FRAME

P = Parity "1" - Odd number of ones in previous ALSEP frame.
 "0" - Even number of ones in previous ALSEP frame.
 F₁ F₂ = ALSEP FRM ID: 00-EVEN, 11-ODD

* BIT WTs. not applicable when defined.

SIDE COMMANDS

The SIDE has the ability to change its data format by command. There are fifteen operational commands. They are divided into two types, on/off commands and mode commands. Initiation of a mode command changes the operational data format characteristics. Executing any mode or on/off command will eliminate the existing operational mode, whereas execution of mode commands will not affect the status of any on/off commanded functions. The 15 commands are listed on the chart on the following page.

The Command Register, supercommutated in 24 of the SIDE frames in SIDE Word 6, reads out the command awaiting execution by the SIDE. The output configuration is shown on chart. Upon execution of a particular command the register will read out zeros.

The Mode Register is supercommutated in 26 of the SIDE frames in SIDE Word 6. It reads out which of the 14 commands is being performed by the SIDE as shown in the chart. The command that doesn't read out in the Mode Register is Reset Command Register which clears the Command Register.

There are two one time Commands, BREAK CCIG SEAL and BLOW DUST COVER. The status of these is supercommutated in 4 side frames of SIDE Word 6, Dust Cover and Seal. When these commands have been executed zeroes will be read out from then on. A one in this measurement indicates that only the Break Seal command has been executed; a two indicates that only the Blow Dust Cover command has been executed; and a 3 indicates that the one time commands have not been executed.

Command	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
Reset Command Register	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Break Seal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Blow Dust Cover	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Command Register	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mode Register	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dust Cover	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Seal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

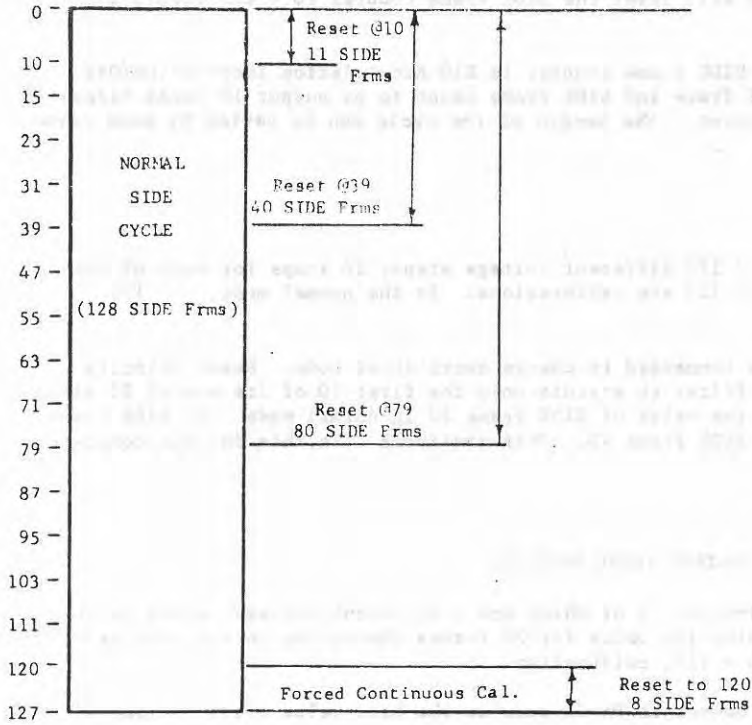
COMMAND OR MODE REGISTER CONTENT - SIDE WORD 6

SIDE CMD No.	COMMAND FUNCTIONS	LSB	9	8	7	6	5	MSB
		10	2 ⁰	2 ¹	2 ²	2 ³	2 ⁴	2 ⁵
1.	Gnd plane step programmer on/off	1	0	0	0	0	0	0
2. *	Reset SIDE frame counter @ 10	0	1	0	0	0	0	0
3. *	Reset SIDE frame counter @ 39	1	1	0	0	0	0	0
4. *	Reset velocity filter @ 9	0	0	1	0	0	0	0
5. *	Reset SIDE frame counter @ 79	1	0	1	0	0	0	0
6. *	Reset SIDE frm ct @ 79 & vel filt @ 9	0	1	1	0	0	0	0
7.	X 10 accumulation interval on/off	1	1	1	0	0	0	0
8. *	Master reset	0	0	0	1	0	0	0
9.	Velocity filter voltage on/off	1	0	0	1	0	0	0
10.	LECPA high voltage on/off	0	1	0	1	0	0	0
11.	HECPA high voltage on/off	1	1	0	1	0	0	0
12. *	Force cont. cal. (Reset to 120)	0	0	1	1	0	0	0
13.	CCIG high voltage on/off	1	0	1	1	0	0	0
14.	Channeltron high voltage on/off	0	1	1	1	0	0	0
15.	Reset command register	1	1	1	1	0	0	0

* - MODE Commands

SIDE WORDS AFFECTED BY SIDE COMMANDS

1. SIDE FRAME COUNTER (SIDE Word 1)



NORMAL MODE

When the SIDE Experiment power is turned on, the SIDE frame counter resets to 0. It then counts through 127 before resetting to 0, resulting in 128 SIDE frames/SIDE cycle. The frame counter increments by one on the receipt of an even frame pulse.

RESET MODE

Upon command the SIDE frame counter may be operated in reset modes to vary the length of a SIDE cycle.

The SIDE frame counter may be operated in modes: Reset @10, Reset @39, or Reset @79. The command to reset SIDE frame counter @10 causes the frame counter to reset to 0 and then count thru 10 rather than the normal 127 before resetting to 0 again. The SIDE cycle during operation in this mode is 11 frames rather than the normal 128. The SIDE frame counter operates in this mode until a command changes the operational mode. Reset @39 and @79 commands cause the frame counter to operate in a similar manner as reset @10, except counter resets to 0 at frames 39 or 79.

Force Continuous Calibration (Reset to 120) command causes the frame counter to reset to 120. It then counts thru 127 and again reset to 120. It continues counting 120-127 giving continuous calibration data until a command changes the mode.

The Master Reset Command will reset the SIDE frame counter to 0 and return the experiment to its normal operational mode.

The execution of an on/off command will reset the SIDE frame counter to 0 and return SIDE to its normal operational mode.

Another command which affects the SIDE frame counter is X10 Accumulation Interval On/Off Command. This command causes each SIDE frame and SIDE frame count to be output 10 times before advancing to the next frame and frame count. The length of the cycle can be varied by mode commands.

2. VELOCITY FILTER VOLTAGE (SIDE WORD 7)

Velocity Filter Voltage consists of 120 different Voltage steps, 20 steps for each of the 6 voltages of the LECPA. Channels 120 - 127 are calibrations. In the normal mode, 126 measurements are readout.

The Velocity Filter Voltage can be commanded to change operational mode. Reset Velocity Filter @ 9 command causes the Velocity Filter to execute only the first 10 of its normal 20 step program. At SIDE frame 10 it assumes the value of SIDE frame 20 in normal mode. At SIDE frame 20 it assumes the normal mode value of SIDE frame 40. This continues like this for the complete 128 frames during normal mode.

3. LOW ENERGY CURVED PLATE ANALYZER (LECPA) VOLTAGE (SIDE WORD 8)

LECPA Voltage consists of 7 measurements, 6 of which are 6 different voltage levels output on a 20 step program. The LECPA maintains its value for 20 frames then steps to the next value. The Seventh measurement is channels 120 - 127, calibration.

Reset Velocity Filter @ 9 command causes LECPA to step to the next value every 10 frames, rather than the normal 20 frames.

1.4.1.5.2 SIDE PARAMETER LISTING

DOWNLINK LISTINGS COLUMN HEADERS

- Col. 1 Experiment name.
- Col. 2 Measurement number. (An asterisk in col. 11 indicates that the word is subcommed)
- Col. 3 Measurement name.
- Col. 4 ALSEP main frame (1-64) word. An asterisk in this column indicates that experiment's words are asynchronous with respect to the ALSEP main frame word.
- Col. 5 ALSEP frame. The ALSEP frame number as read from the ALSEP frame counter in ALSEP word 3. The ALSEP frame counter counts from 1-89, and then to 0, which represents 90. Columns 46-48 may contain one of the following words:
 ALL = ALL ALSEP main frames.
 EVN = Even numbered ALSEP main frames.
 ODD = Odd numbered ALSEP main frames.
- An asterisk in this column indicates that this parameter is asynchronous with respect to the ALSEP frames.
- Col. 6 Bits. Indicates which of the ten or twenty bits of an ALSEP (1-10) or experiment (1-10 or 1-20) word contain the measurement number given in columns 7-11.
- Col. 7 Samples per Main Frame (S/MF). Indicates how often (on the average) a parameter appears in the ALSEP main frame.
- Col. 8 Experiment word. For the SIDE these columns indicate the SIDE word number (1-5)
 For the CPLEE these columns indicate the CPLEE word number (1-32)
- Col. 9 Experiment Frame. For the side these columns indicate the SIDE frame number (0-127)
- Col. 10 Flag bits

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD	FRM	BITS	S/MF	SIDE WD	SIDE FRAME	EG BT
SIDE	DF-7	PARITY	15	EVN	1	128/256	1	0-127	
SIDE	DF-8	FRAME ID (00)	15	EVN	2-3	128/256	1	0-127	
SIDE	DI-1	SIDE FRM CTR (0-127)	15	EVN	4-10	128/256	1	0-127	
SIDE		FILL ZEROS	31	EVN	1-2	128/256	2	0-127	
SIDE	DI-2	+5 VOLTS ANALOG	31	EVN	3-10	4/256	2	0	
SIDE	DI-3	CCGE OUTPUT	31	EVN	3-10	15/256	2	1	
SIDE	DI-4	TEMP-1	31	EVN	3-10	4/256	2	2	
SIDE	DI-3	CCGE OUTPUT	31	EVN	3-10	15/256	2	3	
SIDE	DI-5	TEMP-2	31	EVN	3-10	4/256	2	4	
SIDE	DI-3	CCGE OUTPUT	31	EVN	3-10	15/256	2	5	
SIDE	DI-6	TEMP-3	31	EVN	3-10	4/256	2	6	
SIDE	DI-3	CCGE OUTPUT	31	EVN	3-10	15/256	2	7	
SIDE	DI-7	4.5 KV	31	EVN	3-10	4/256	2	8	
SIDE	DI-3	CCGE OUTPUT	31	EVN	3-10	15/256	2	9	
SIDE	DI-8	CCGE RANGE	31	EVN	3-10	8/256	2	10	
SIDE	DI-9	TEMP-4	31	EVN	3-10	4/256	2	11	
SIDE	DI-10	TEMP-5	31	EVN	3-10	4/256	2	12	
SIDE	DI-11	GND PLANE VOLTAGE	31	EVN	3-10	15/256	2	13	
SIDE	DI-12	SOLAR CELL	31	EVN	3-10	2/256	2	14	
SIDE	DI-11	GND PLANE VOLTAGE	31	EVN	3-10	15/256	2	15	
SIDE	DI-13	+60 VOLTS	31	EVN	3-10	4/256	2	16	
SIDE	DI-14	+30 VOLTS	31	EVN	3-10	4/256	2	17	
SIDE	DI-15	+5 VOLTS DIGITAL	31	EVN	3-10	4/256	2	18	
SIDE	DI-16	GROUND	31	EVN	3-10	4/256	2	19	
SIDE	DI-17	-5 VOLTS	31	EVN	3-10	4/256	2	20	
SIDE	DI-18	-30 VOLTS	31	EVN	3-10	4/256	2	21	
SIDE	DI-19	TEMP-6	31	EVN	3-10	4/256	2	22	
SIDE	DI-20	-3.5 KV	31	EVN	3-10	4/256	2	23	
SIDE	DI-8	CCGE RANGE	31	EVN	3-10	8/256	2	24	
SIDE	DI-22	+30 MULTIVOLT CAL	31	EVN	3-10	3/256	2	25	
SIDE	DI-23	+A/D REF VOLTAGE	31	EVN	3-10	3/256	2	26	
SIDE	DI-21	+1.0 VOLT CAL	31	EVN	3-10	3/256	2	27	
SIDE	DI-28	+12 VOLT CAL	31	EVN	3-10	3/256	2	28	
SIDE	DI-11	GND PLANE VOLTAGE	31	EVN	3-10	15/256	2	29	
SIDE	DI-25	-A/D REF VOLT	31	EVN	3-10	3/256	2	30	

EX. NAME	MEAS NO	MEAS NAME	ALSEP			S/MF	SIDE WD	SIDE FRAME	FG BT
			WD	FRM	BITS				
SIDE	DI-11	GND PLANE VOLTAGE	31	EVN	3-10	15/256	2	31	
SIDE	DI-2	+5 VOLTS ANALOG	31	EVN	3-10	4/256	2	32	
SIDE	DI-29	1-TIME CMD REG STAT	31	EVN	3-10	4/256	2	33	
SIDE	DI-4	TEMP-1	31	EVN	3-10	4/256	2	34	
SIDE	DI-29	1-TIME CMD REG STAT	31	EVN	3-10	4/256	2	35	
SIDE	DI-5	TEMP-2	31	EVN	3-10	4/256	2	36	
SIDE	DI-26	-1.0 VOLT CAL	31	EVN	3-10	2/256	2	37	
SIDE	DI-6	TEMP-3	31	EVN	3-10	4/256	2	38	
SIDE	DI-27	-12 VOLT CAL	31	EVN	3-10	2/256	2	39	
SIDE	DI-7	4.5 KV	31	EVN	3-10	4/256	2	40	
SIDE	DI-3	CCGE OUTPUT	31	EVN	3-10	15/256	2	41	
SIDE	DI-8	CCGE RANGE	31	EVN	3-10	8/256	2	42	
SIDE	DI-9	TEMP-4	31	EVN	3-10	4/256	2	43	
SIDE	DI-10	TEMP-5	31	EVN	3-10	4/256	2	44	
SIDE	DI-11	GND PLANE VOLTAGE	31	EVN	3-10	15/256	2	45	
SIDE	DI-30	-30 MULTIVOLT CAL	31	EVN	3-10	2/256	2	46	
SIDE	DI-11	GND PLANE VOLTAGE	31	EVN	3-10	15/256	2	47	
SIDE	DI-13	+60 VOLTS	31	EVN	3-10	4/256	2	48	
SIDE	DI-14	+30 VOLTS	31	EVN	3-10	4/256	2	49	
SIDE	DI-15	+5 VOLTS DIGITAL	31	EVN	3-10	4/256	2	50	
SIDE	DI-16	GROUND	31	EVN	3-10	4/256	2	51	
SIDE	DI-17	-5 VOLTS	31	EVN	3-10	4/256	2	52	
SIDE	DI-18	-30 VOLTS	31	EVN	3-10	4/256	2	53	
SIDE	DI-19	TEMP-6	31	EVN	3-10	4/256	2	54	
SIDE	DI-20	-3.5 KV	31	EVN	3-10	4/256	2	55	
SIDE	DI-8	CCGE RANGE	31	EVN	3-10	8/256	2	56	
SIDE	DI-22	+30 MULTIVOLT CAL	31	EVN	3-10	3/256	2	57	
SIDE	DI-23	+A/D REF VOLTAGE	31	EVN	3-10	3/256	2	58	
SIDE	DI-21	+1.0 VOLT CAL	31	EVN	3-10	3/256	2	59	
SIDE	DI-28	+12 VOLT CAL	31	EVN	3-10	3/256	2	60	
SIDE	DI-11	GND PLANE VOLTAGE	31	EVN	3-10	15/256	2	61	
SIDE	DI-25	-A/D REF VOLT	31	EVN	3-10	3/256	2	62	
SIDE	DI-11	GND PLANE VOLTAGE	31	EVN	3-10	15/256	2	63	
SIDE	DI-2	+5 VOLTS ANALOG	31	EVN	3-10	4/256	2	64	
SIDE	DI-29	PRE REG DUTY FACTOR	31	EVN	3-10	1/256	2	65	

EXP NAME	MEAS NO	MEAS NAME	ALSEP		S/MF	SIDE WD	SIDE FRAME	FG BT
			WD	FRM BITS				
SIDE	DI-4	TEMP-1	31	EVN 3-10	4/256	2		66
SIDE	DI-24	DUST COVER AND SEAL	31	EVN 3-10	2/256	2		67
SIDE	DI-5	TEMP-2	31	EVN 3-10	4/256	2		68
SIDE	DI-11	GND PLANE VOLTAGE	31	EVN 3-10	15/256	2		69
SIDE	DI-6	TEMP-3	31	EVN 3-10	4/256	2		70
SIDE	DI-24	DUST COVER AND SEAL	31	EVN 3-10	2/256	2		71
SIDE	DI-7	4.5 KV	31	EVN 3-10	4/256	2		72
SIDE	DI-3	CCGE OUTPUT	31	EVN 3-10	15/256	2		73
SIDE	DI-8	CCGE RANGE	31	EVN 3-10	8/256	2		74
SIDE	DI-9	TEMP-4	31	EVN 3-10	4/256	2		75
SIDE	DI-10	TEMP-5	31	EVN 3-10	4/256	2		76
SIDE	DI-11	GND PLANE VOLTAGE	31	EVN 3-10	8/256	2		77
SIDE	DI-12	SOLAR CELL	31	EVN 3-10	2/256	2		78
SIDE	DI-11	GND PLANE VOLTAGE	31	EVN 3-10	8/256	2		79
SIDE	DI-13	+60 VOLTS	31	EVN 3-10	4/256	2		80
SIDE	DI-14	+30 VOLTS	31	EVN 3-10	4/256	2		81
SIDE	DI-15	+5 VOLTS DIGITAL	31	EVN 3-10	4/256	2		82
SIDE	DI-16	GROUND	31	EVN 3-10	4/256	2		83
SIDE	DI-17	-5 VOLTS	31	EVN 3-10	4/256	2		84
SIDE	DI-18	-30 VOLTS	31	EVN 3-10	4/256	2		85
SIDE	DI-19	TEMP-6	31	EVN 3-10	4/256	2		86
SIDE	DI-20	-3.5 KV	31	EVN 3-10	4/256	2		87
SIDE	DI-8	CCGE RANGE	31	EVN 3-10	8/256	2		88
SIDE	DI-22	+30 MULTIVOLT CAL	31	EVN 3-10	3/256	2		89
SIDE	DI-23	+A/D REF VOLTAGE	31	EVN 3-10	3/256	2		90
SIDE	DI-21	+1.0 VOLT CAL	31	EVN 3-10	3/256	2		91
SIDE	DI-28	+12 VOLT CAL	31	EVN 3-10	3/256	2		92
SIDE	DI-11	GND PLANE VOLTAGE	31	EVN 3-10	8/256	2		93
SIDE	DI-25	-A/D REF VOLT	31	EVN 3-10	3/256	2		94
SIDE	DI-11	GND PLANE VOLTAGE	31	EVN 3-10	8/256	2		95
SIDE	DI-2	+5 VOLTS ANALOG	31	EVN 3-10	4/256	2		96
SIDE	DF-29	1-TIME CMD REG STAT	31	EVN 3-10	4/256	2		97
SIDE	DI-4	TEMP-1	31	EVN 3-10	4/256	2		98
SIDE	DF-29	1-TIME CMD REG STAT	31	EVN 3-10	4/256	2		99
SIDE	DI-5	TEMP-2	31	EVN 3-10	4/256	2		100

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD	FRM	BITS	S/MF	SIDE WD	SIDE FRAME	FG BT
SIDE	D1-26	-1.0 VOLT CAL	31	EVN	3-10	2/256	2	101	
SIDE	D1-6	TEMP-3	31	EVN	3-10	4/256	2	102	
SIDE	D1-27	-12 VOLT CAL	31	EVN	3-10	2/256	2	103	
SIDE	D1-7	4.5 KV	31	EVN	3-10	4/256	2	104	
SIDE	D1-3	CCGE OUTPUT	31	EVN	3-10	15/256	2	105	
SIDE	D1-8	CCGE RANGE	31	EVN	3-10	8/256	2	106	
SIDE	D1-9	TEMP-4	31	EVN	3-10	4/256	2	107	
SIDE	D1-10	TEMP-5	31	EVN	3-10	4/256	2	108	
SIDE	D1-11	GND PLANE VOLTAGE	31	EVN	3-10	8/256	2	109	
SIDE	D1-30	+30 MULTIVOLT CAL	31	EVN	3-10	2/256	2	110	
SIDE	D1-11	GND PLANE VOLTAGE	31	EVN	3-10	8/256	2	111	
SIDE	D1-13	+60 VOLTS	31	EVN	3-10	4/256	2	112	
SIDE	D1-14	+30 VOLTS	31	EVN	3-10	4/256	2	113	
SIDE	D1-15	+5 VOLTS DIGITAL	31	EVN	3-10	4/256	2	114	
SIDE	D1-16	GROUND	31	EVN	3-10	4/256	2	115	
SIDE	D1-17	-5 VOLTS	31	EVN	3-10	4/256	2	116	
SIDE	D1-18	-30 VOLTS	31	EVN	3-10	4/256	2	117	
SIDE	D1-19	TEMP-6	31	EVN	3-10	4/256	2	118	
SIDE	D1-20	-3.5 KV	31	EVN	3-10	4/256	2	119	
SIDE	D1-8	CCGE RANGE	31	EVN	3-10	8/256	2	120	
SIDE	D1-3	CCGE OUTPUT	31	EVN	3-10	15/256	2	121	
SIDE	D1-3	CCGE OUTPUT	31	EVN	3-10	15/256	2	122	
SIDE	D1-3	CCGE OUTPUT	31	EVN	3-10	15/256	2	123	
SIDE	D1-3	CCGE OUTPUT	31	EVN	3-10	15/256	2	124	
SIDE	D1-3	CCGE OUTPUT	31	EVN	3-10	15/256	2	125	
SIDE	D1-3	CCGE OUTPUT	31	EVN	3-10	15/256	2	126	
SIDE	D1-3	CCGE OUTPUT	31	EVN	3-10	15/256	2	127	
SIDE		FILL ZEROS	47	EVN	1-2	128/256	3	0-127	
SIDE	D1-60	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3	0	
SIDE	D1-40	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3	1	
SIDE	D1-41	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3	2	
SIDE	D1-42	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3	3	
SIDE	D1-43	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3	4	
SIDE	D1-44	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3	5	
SIDE	D1-45	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3	6	

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD FRM BITS	S/MF	SIDE WD	SIDE FRAME	FG BT
SIDE	DI-46	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		7
SIDE	DI-47	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		8
SIDE	DI-48	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		9
SIDE	DI-49	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		10
SIDE	DI-50	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		11
SIDE	DI-51	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		12
SIDE	DI-52	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		13
SIDE	DI-53	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		14
SIDE	DI-54	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		15
SIDE	DI-55	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		16
SIDE	DI-56	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		17
SIDE	DI-57	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		18
SIDE	DI-58	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		19
SIDE	DI-59	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		20
SIDE	DI-40	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		21
SIDE	DI-41	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		22
SIDE	DI-42	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		23
SIDE	DI-43	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		24
SIDE	DI-44	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		25
SIDE	DI-45	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		26
SIDE	DI-46	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		27
SIDE	DI-47	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		28
SIDE	DI-48	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		29
SIDE	DI-49	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		30
SIDE	DI-50	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		31
SIDE	DI-51	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		32
SIDE	DI-52	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		33
SIDE	DI-53	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		34
SIDE	DI-54	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		35
SIDE	DI-55	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		36
SIDE	DI-56	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		37
SIDE	DI-57	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		38
SIDE	DI-58	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		39
SIDE	DI-59	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		40
SIDE	DI-40	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		41

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD FRM	BITS	S/MF	SIDE WD	SIDE FRAME	FG BT
SIDE	01-41	HECPA STEP VOLTAGE	47 EVN	3-10	6/256	3		42
SIDE	01-42	HECPA STEP VOLTAGE	47 EVN	3-10	6/256	3		43
SIDE	01-43	HECPA STEP VOLTAGE	47 EVN	3-10	6/256	3		44
SIDE	01-44	HECPA STEP VOLTAGE	47 EVN	3-10	6/256	3		45
SIDE	01-45	HECPA STEP VOLTAGE	47 EVN	3-10	6/256	3		46
SIDE	01-46	HECPA STEP VOLTAGE	47 EVN	3-10	6/256	3		47
SIDE	01-47	HECPA STEP VOLTAGE	47 EVN	3-10	6/256	3		48
SIDE	01-48	HECPA STEP VOLTAGE	47 EVN	3-10	6/256	3		49
SIDE	01-49	HECPA STEP VOLTAGE	47 EVN	3-10	6/256	3		50
SIDE	01-50	HECPA STEP VOLTAGE	47 EVN	3-10	6/256	3		51
SIDE	01-51	HECPA STEP VOLTAGE	47 EVN	3-10	6/256	3		52
SIDE	01-52	HECPA STEP VOLTAGE	47 EVN	3-10	6/256	3		53
SIDE	01-53	HECPA STEP VOLTAGE	47 EVN	3-10	6/256	3		54
SIDE	01-54	HECPA STEP VOLTAGE	47 EVN	3-10	6/256	3		55
SIDE	01-55	HECPA STEP VOLTAGE	47 EVN	3-10	6/256	3		56
SIDE	01-56	HECPA STEP VOLTAGE	47 EVN	3-10	6/256	3		57
SIDE	01-57	HECPA STEP VOLTAGE	47 EVN	3-10	6/256	3		58
SIDE	01-58	HECPA STEP VOLTAGE	47 EVN	3-10	6/256	3		59
SIDE	01-59	HECPA STEP VOLTAGE	47 EVN	3-10	6/256	3		60
SIDE	01-40	HECPA STEP VOLTAGE	47 EVN	3-10	6/256	3		61
SIDE	01-41	HECPA STEP VOLTAGE	47 EVN	3-10	6/256	3		62
SIDE	01-42	HECPA STEP VOLTAGE	47 EVN	3-10	6/256	3		63
SIDE	01-43	HECPA STEP VOLTAGE	47 EVN	3-10	6/256	3		64
SIDE	01-44	HECPA STEP VOLTAGE	47 EVN	3-10	6/256	3		65
SIDE	01-45	HECPA STEP VOLTAGE	47 EVN	3-10	6/256	3		66
SIDE	01-46	HECPA STEP VOLTAGE	47 EVN	3-10	6/256	3		67
SIDE	01-47	HECPA STEP VOLTAGE	47 EVN	3-10	6/256	3		68
SIDE	01-48	HECPA STEP VOLTAGE	47 EVN	3-10	6/256	3		69
SIDE	01-49	HECPA STEP VOLTAGE	47 EVN	3-10	6/256	3		70
SIDE	01-50	HECPA STEP VOLTAGE	47 EVN	3-10	6/256	3		71
SIDE	01-51	HECPA STEP VOLTAGE	47 EVN	3-10	6/256	3		72
SIDE	01-52	HECPA STEP VOLTAGE	47 EVN	3-10	6/256	3		73
SIDE	01-53	HECPA STEP VOLTAGE	47 EVN	3-10	6/256	3		74
SIDE	01-54	HECPA STEP VOLTAGE	47 EVN	3-10	6/256	3		75
SIDE	01-55	HECPA STEP VOLTAGE	47 EVN	3-10	6/256	3		76

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD FRM BITS	S/MF	SIDE WD	SIDE FRAME	FG BT
SIDE	DI-56	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		77
SIDE	DI-57	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		78
SIDE	DI-58	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		79
SIDE	DI-59	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		80
SIDE	DI-40	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		81
SIDE	DI-41	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		82
SIDE	DI-42	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		83
SIDE	DI-43	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		84
SIDE	DI-44	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		85
SIDE	DI-45	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		86
SIDE	DI-46	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		87
SIDE	DI-47	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		88
SIDE	DI-48	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		89
SIDE	DI-49	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		90
SIDE	DI-50	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		91
SIDE	DI-51	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		92
SIDE	DI-52	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		93
SIDE	DI-53	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		94
SIDE	DI-54	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		95
SIDE	DI-55	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		96
SIDE	DI-56	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		97
SIDE	DI-57	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		98
SIDE	DI-58	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		99
SIDE	DI-59	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		100
SIDE	DI-40	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		101
SIDE	DI-41	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		102
SIDE	DI-42	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		103
SIDE	DI-43	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		104
SIDE	DI-44	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		105
SIDE	DI-45	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		106
SIDE	DI-46	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		107
SIDE	DI-47	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		108
SIDE	DI-48	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		109
SIDE	DI-49	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		110
SIDE	DI-50	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		111

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD FRM	BITS	S/MF	SIDE WD	SIDE FRAME	FG BT
SIDE	D1-51	HECPA STEP VOLTAGE	47 EVN	3-10	6/256	3	112	
SIDE	D1-52	HECPA STEP VOLTAGE	47 EVN	3-10	6/256	3	113	
SIDE	D1-53	HECPA STEP VOLTAGE	47 EVN	3-10	6/256	3	114	
SIDE	D1-54	HECPA STEP VOLTAGE	47 EVN	3-10	6/256	3	115	
SIDE	D1-55	HECPA STEP VOLTAGE	47 EVN	3-10	6/256	3	116	
SIDE	D1-56	HECPA STEP VOLTAGE	47 EVN	3-10	6/256	3	117	
SIDE	D1-57	HECPA STEP VOLTAGE	47 EVN	3-10	6/256	3	118	
SIDE	D1-58	HECPA STEP VOLTAGE	47 EVN	3-10	6/256	3	119	
SIDE	D1-59	HECPA STEP VOLTAGE	47 EVN	3-10	6/256	3	120	
SIDE	D1-60	HECPA STEP VOLTAGE	47 EVN	3-10	6/256	3	121	
SIDE	D1-60	HECPA STEP VOLTAGE	47 EVN	3-10	6/256	3	122	
SIDE	D1-60	HECPA STEP VOLTAGE	47 EVN	3-10	6/256	3	123	
SIDE	D1-60	HECPA STEP VOLTAGE	47 EVN	3-10	6/256	3	124	
SIDE	D1-60	HECPA STEP VOLTAGE	47 EVN	3-10	6/256	3	125	
SIDE	D1-60	HECPA STEP VOLTAGE	47 EVN	3-10	6/256	3	126	
SIDE	D1-60	HECPA STEP VOLTAGE	47 EVN	3-10	6/256	3	127	
SIDE	D1-61	HE DATA - MSD	56 EVN	1-10	128/256	4	0-127	
SIDE	D1-62	HE DATA - LSD	63 EVN	1-10	128/256	5	0-127	
SIDE	DF-7	PARITY	15 ODD	1	128/256	6	0-127	
SIDE	DF-8	FRAME ID (11)	15 ODD	2-3	128/256	6	0-127	
SIDE	D1-63	GND PLANE STEP NO.	15 ODD	4-10	60/256	6	0	
SIDE	D1-64	COMMAND REGISTER	15 ODD	4-10	24/256	6	1	
SIDE	D1-63	GND PLANE STEP NO.	15 ODD	4-10	60/256	6	2	
SIDE	D1-65	MODE REGISTER	15 ODD	4-10	26/256	6	3	
SIDE	D1-63	GND PLANE STEP NO.	15 ODD	4-10	60/256	6	4	
SIDE	D1-64	COMMAND REGISTER	15 ODD	4-10	24/256	6	5	
SIDE	D1-63	GND PLANE STEP NO.	15 ODD	4-10	60/256	6	6	
SIDE	D1-66	DUST COVER AND SEAL	15 ODD	4-10	4/256	6	7	
SIDE	D1-63	GND PLANE STEP NO.	15 ODD	4-10	60/256	6	8	
SIDE	D1-67	ELECTROMETER RANGE	15 ODD	4-10	7/256	6	9	
SIDE	D1-63	GND PLANE STEP NO.	15 ODD	4-10	60/256	6	10	
SIDE	D1-65	MODE REGISTER	15 ODD	4-10	26/256	6	11	
SIDE	D1-63	GND PLANE STEP NO.	15 ODD	4-10	60/256	6	12	
SIDE	D1-64	COMMAND REGISTER	15 ODD	4-10	24/256	6	13	
SIDE	D1-63	GND PLANE STEP NO.	15 ODD	4-10	60/256	6	14	

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD	FRM	BITS	S/MF	SIDE WD	SIDE FRAME	FG BT
SIDE	DI-65	MODE REGISTER	15	ODD	4-10	26/256	6	15	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	16	
SIDE	DI-64	COMMAND REGISTER	15	ODD	4-10	24/256	6	17	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	18	
SIDE	DI-65	MODE REGISTER	15	ODD	4-10	26/256	6	19	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	20	
SIDE	DI-64	COMMAND REGISTER	15	ODD	4-10	24/256	6	21	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	22	
SIDE	DI-65	MODE REGISTER	15	ODD	4-10	26/256	6	23	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	24	
SIDE	DI-67	ELECTROMETER RANGE	15	ODD	4-10	7/256	6	25	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	26	
SIDE	DI-65	MODE REGISTER	15	ODD	4-10	26/256	6	27	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	28	
SIDE	DI-64	COMMAND REGISTER	15	ODD	4-10	24/256	6	29	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	30	
SIDE	DI-65	MODE REGISTER	15	ODD	4-10	26/256	6	31	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	32	
SIDE	DI-64	COMMAND REGISTER	15	ODD	4-10	24/256	6	33	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	34	
SIDE	DI-65	MODE REGISTER	15	ODD	4-10	26/256	6	35	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	36	
SIDE	DI-64	COMMAND REGISTER	15	ODD	4-10	24/256	6	37	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	38	
SIDE	DI-66	DUST COVER AND SEAL	15	ODD	4-10	4/256	6	39	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	40	
SIDE	DI-67	ELECTROMETER RANGE	15	ODD	4-10	7/256	6	41	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	42	
SIDE	DI-65	MODE REGISTER	15	ODD	4-10	26/256	6	43	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	44	
SIDE	DI-64	COMMAND REGISTER	15	ODD	4-10	24/256	6	45	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	46	
SIDE	DI-65	MODE REGISTER	15	ODD	4-10	26/256	6	47	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	48	
SIDE	DI-64	COMMAND REGISTER	15	ODD	4-10	24/256	6	49	

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD	FRM	BITS	S/MF	SIDE WD	SIDE FRAME	FG BT
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	50	
SIDE	DI-65	MODE REGISTER	15	ODD	4-10	26/256	6	51	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	52	
SIDE	DI-64	COMMAND REGISTER	15	ODD	4-10	24/256	6	53	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	54	
SIDE	DI-65	MODE REGISTER	15	ODD	4-10	26/256	6	55	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	56	
SIDE	DI-67	ELECTROMETER RANGE	15	ODD	4-10	7/256	6	57	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	58	
SIDE	DI-65	MODE REGISTER	15	ODD	4-10	26/256	6	59	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	60	
SIDE	DI-64	COMMAND REGISTER	15	ODD	4-10	24/256	6	61	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	62	
SIDE	DI-65	MODE REGISTER	15	ODD	4-10	26/256	6	63	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	64	
SIDE	DI-64	COMMAND REGISTER	15	ODD	4-10	24/256	6	65	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	66	
SIDE	DI-65	MODE REGISTER	15	ODD	4-10	26/256	6	67	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	68	
SIDE	DI-64	COMMAND REGISTER	15	ODD	4-10	24/256	6	69	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	70	
SIDE	DI-66	DUST COVER AND SEAL	15	ODD	4-10	4/256	6	71	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	72	
SIDE	DI-67	ELECTROMETER RANGE	15	ODD	4-10	7/256	6	73	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	74	
SIDE	DI-65	MODE REGISTER	15	ODD	4-10	26/256	6	75	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	76	
SIDE	DI-64	COMMAND REGISTER	15	ODD	4-10	24/256	6	77	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	78	
SIDE	DI-65	MODE REGISTER	15	ODD	4-10	26/256	6	79	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	80	
SIDE	DI-64	COMMAND REGISTER	15	ODD	4-10	24/256	6	81	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	82	
SIDE	DI-65	MODE REGISTER	15	ODD	4-10	26/256	6	83	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	84	

EXP. NAME	MEAS NO	MEAS NAME	ALSEP WD	FRM	BITS	S/MF	SIDE WD	SIDE FRAME	FG BT
SIDE	DI-64	COMMAND REGISTER	15	ODD	4-10	24/256	6	85	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	86	
SIDE	DI-65	MODE REGISTER	15	ODD	4-10	26/256	6	87	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	88	
SIDE	DI-67	ELECTROMETER RANGE	15	ODD	4-10	7/256	6	89	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	90	
SIDE	DI-65	MODE REGISTER	15	ODD	4-10	26/256	6	91	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	92	
SIDE	DI-64	COMMAND REGISTER	15	ODD	4-10	24/256	6	93	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	94	
SIDE	DI-65	MODE REGISTER	15	ODD	4-10	26/256	6	95	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	96	
SIDE	DI-64	COMMAND REGISTER	15	ODD	4-10	24/256	6	97	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	98	
SIDE	DI-65	MODE REGISTER	15	ODD	4-10	26/256	6	99	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	100	
SIDE	DI-64	COMMAND REGISTER	15	ODD	4-10	24/256	6	101	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	102	
SIDE	DI-66	DUST COVER AND SEAL	15	ODD	4-10	4/256	6	103	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	104	
SIDE	DI-67	ELECTROMETER RANGE	15	ODD	4-10	7/256	6	105	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	106	
SIDE	DI-65	MODE REGISTER	15	ODD	4-10	26/256	6	107	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	108	
SIDE	DI-64	COMMAND REGISTER	15	ODD	4-10	24/256	6	109	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	110	
SIDE	DI-65	MODE REGISTER	15	ODD	4-10	26/256	6	111	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	112	
SIDE	DI-64	COMMAND REGISTER	15	ODD	4-10	24/256	6	113	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	114	
SIDE	DI-65	MODE REGISTER	15	ODD	4-10	26/256	6	115	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	116	
SIDE	DI-64	COMMAND REGISTER	15	ODD	4-10	24/256	6	117	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	118	
SIDE	DI-65	MODE REGISTER	15	ODD	4-10	26/256	6	119	

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD	FRM	BITS	S/MF	SIDE WD	SIDE FRAME	FG BT
SIDE	DI-68	CAL RATE-1 STATUS	15	ODD	4-10	2/256	6		120
SIDE	DI-69	CAL RATE-2 STATUS	15	ODD	4-10	1/256	6		121
SIDE	DI-70	CAL RATE-3 STATUS	15	ODD	4-10	2/256	6		122
SIDE	DI-71	CAL RATE-4 STATUS	15	ODD	4-10	2/256	6		123
SIDE	DI-68	CAL RATE-1 STATUS	15	ODD	4-10	2/256	6		124
SIDE	DI-64	COMMAND REGISTER	15	ODD	4-10	24/256	6		125
SIDE	DI-70	CAL RATE-3 STATUS	15	ODD	4-10	2/256	6		126
SIDE	DI-71	CAL RATE-4 STATUS	15	ODD	4-10	2/256	6		127
SIDE		FILL ZEPOS	31	ODD	1-2	128/256	7	0-127	
SIDE	DI-72	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7		0
SIDE	DI-73	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7		1
SIDE	DI-74	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7		2
SIDE	DI-75	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7		3
SIDE	DI-76	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7		4
SIDE	DI-77	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7		5
SIDE	DI-78	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7		6
SIDE	DI-79	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7		7
SIDE	DI-80	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7		8
SIDE	DI-81	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7		9
SIDE	DI-82	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7		10
SIDE	DI-83	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7		11
SIDE	DI-84	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7		12
SIDE	DI-85	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7		13
SIDE	DI-86	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7		14
SIDE	DI-87	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7		15
SIDE	DI-88	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7		16
SIDE	DI-89	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7		17
SIDE	DI-90	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7		18
SIDE	DI-91	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7		19
SIDE	DI-92	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7		20
SIDE	DI-93	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7		21
SIDE	DI-94	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7		22
SIDE	DI-95	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7		23
SIDE	DI-96	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7		24
SIDE	DI-97	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7		25

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD FRM BITS	S/MF	SIDE WD	SIDE FRAME	FG BT
SIDE	DJ-98	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	26	
SIDE	DJ-99	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	27	
SIDE	DJ-0	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	28	
SIDE	DJ-1	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	29	
SIDE	DJ-2	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	30	
SIDE	DJ-3	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	31	
SIDE	DJ-4	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	32	
SIDE	DJ-5	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	33	
SIDE	DJ-6	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	34	
SIDE	DJ-7	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	35	
SIDE	DJ-8	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	36	
SIDE	DJ-9	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	37	
SIDE	DJ-10	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	38	
SIDE	DJ-11	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	39	
SIDE	DJ-12	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	40	
SIDE	DJ-13	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	41	
SIDE	DJ-14	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	42	
SIDE	DJ-15	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	43	
SIDE	DJ-16	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	44	
SIDE	DJ-17	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	45	
SIDE	DJ-18	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	46	
SIDE	DJ-19	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	47	
SIDE	DJ-20	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	48	
SIDE	DJ-21	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	49	
SIDE	DJ-22	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	50	
SIDE	DJ-23	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	51	
SIDE	DJ-24	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	52	
SIDE	DJ-25	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	53	
SIDE	DJ-26	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	54	
SIDE	DJ-27	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	55	
SIDE	DJ-28	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	56	
SIDE	DJ-29	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	57	
SIDE	DJ-30	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	58	
SIDE	DJ-31	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	59	
SIDE	DJ-32	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	60	

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EXP NAME	MEAS NO	MEAS NAME	ALSEP WD FRM	BITS	S/MF	SIDE WD	SIDE FRAME	FG BT
SIDE	DJ-33	VEL FILTER VOLTAGE	31	ODD 3-10	1/256	7		61
SIDE	DJ-34	VEL FILTER VOLTAGE	31	ODD 3-10	1/256	7		62
SIDE	DJ-35	VEL FILTER VOLTAGE	31	ODD 3-10	1/256	7		63
SIDE	DJ-36	VEL FILTER VOLTAGE	31	ODD 3-10	1/256	7		64
SIDE	DJ-37	VEL FILTER VOLTAGE	31	ODD 3-10	1/256	7		65
SIDE	DJ-38	VEL FILTER VOLTAGE	31	ODD 3-10	1/256	7		66
SIDE	DJ-39	VEL FILTER VOLTAGE	31	ODD 3-10	1/256	7		67
SIDE	DJ-40	VEL FILTER VOLTAGE	31	ODD 3-10	1/256	7		68
SIDE	DJ-41	VEL FILTER VOLTAGE	31	ODD 3-10	1/256	7		69
SIDE	DJ-42	VEL FILTER VOLTAGE	31	ODD 3-10	1/256	7		70
SIDE	DJ-43	VEL FILTER VOLTAGE	31	ODD 3-10	1/256	7		71
SIDE	DJ-44	VEL FILTER VOLTAGE	31	ODD 3-10	1/256	7		72
SIDE	DJ-45	VEL FILTER VOLTAGE	31	ODD 3-10	1/256	7		73
SIDE	DJ-46	VEL FILTER VOLTAGE	31	ODD 3-10	1/256	7		74
SIDE	DJ-47	VEL FILTER VOLTAGE	31	ODD 3-10	1/256	7		75
SIDE	DJ-48	VEL FILTER VOLTAGE	31	ODD 3-10	1/256	7		76
SIDE	DJ-49	VEL FILTER VOLTAGE	31	ODD 3-10	1/256	7		77
SIDE	DJ-50	VEL FILTER VOLTAGE	31	ODD 3-10	1/256	7		78
SIDE	DJ-51	VEL FILTER VOLTAGE	31	ODD 3-10	1/256	7		79
SIDE	DJ-52	VEL FILTER VOLTAGE	31	ODD 3-10	1/256	7		80
SIDE	DJ-53	VEL FILTER VOLTAGE	31	ODD 3-10	1/256	7		81
SIDE	DJ-54	VEL FILTER VOLTAGE	31	ODD 3-10	1/256	7		82
SIDE	DJ-55	VEL FILTER VOLTAGE	31	ODD 3-10	1/256	7		83
SIDE	DJ-56	VEL FILTER VOLTAGE	31	ODD 3-10	1/256	7		84
SIDE	DJ-57	VEL FILTER VOLTAGE	31	ODD 3-10	1/256	7		85
SIDE	DJ-58	VEL FILTER VOLTAGE	31	ODD 3-10	1/256	7		86
SIDE	DJ-59	VEL FILTER VOLTAGE	31	ODD 3-10	1/256	7		87
SIDE	DJ-60	VEL FILTER VOLTAGE	31	ODD 3-10	1/256	7		88
SIDE	DJ-61	VEL FILTER VOLTAGE	31	ODD 3-10	1/256	7		89
SIDE	DJ-62	VEL FILTER VOLTAGE	31	ODD 3-10	1/256	7		90
SIDE	DJ-63	VEL FILTER VOLTAGE	31	ODD 3-10	1/256	7		91
SIDE	DJ-64	VEL FILTER VOLTAGE	31	ODD 3-10	1/256	7		92
SIDE	DJ-65	VEL FILTER VOLTAGE	31	ODD 3-10	1/256	7		93
SIDE	DJ-66	VEL FILTER VOLTAGE	31	ODD 3-10	1/256	7		94
SIDE	DJ-67	VEL FILTER VOLTAGE	31	ODD 3-10	1/256	7		95

EXP	MEAS		ALSEP		SIDE	SIDE	FG
NAME	NO	MEAS NAME	WD FRM BITS	S/MF	WD	FRAME	BT
SIDE	DJ-68	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	96	
SIDE	DJ-69	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	97	
SIDE	DJ-70	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	98	
SIDE	DJ-71	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	99	
SIDE	DJ-72	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	100	
SIDE	DJ-73	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	101	
SIDE	DJ-74	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	102	
SIDE	DJ-75	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	103	
SIDE	DJ-76	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	104	
SIDE	DJ-77	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	105	
SIDE	DJ-78	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	106	
SIDE	DJ-79	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	107	
SIDE	DJ-80	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	108	
SIDE	DJ-81	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	109	
SIDE	DJ-82	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	110	
SIDE	DJ-83	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	111	
SIDE	DJ-84	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	112	
SIDE	DJ-85	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	113	
SIDE	DJ-86	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	114	
SIDE	DJ-87	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	115	
SIDE	DJ-88	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	116	
SIDE	DJ-89	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	117	
SIDE	DJ-90	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	118	
SIDE	DJ-91	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	119	
SIDE	DJ-92	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	120	
SIDE	DJ-93	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	121	
SIDE	DJ-94	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	122	
SIDE	DJ-95	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	123	
SIDE	DJ-96	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	124	
SIDE	DJ-97	VEL FILTER VOLTAGE	31 ODD 3-10	3/256	7	125	
SIDE	DJ-97	VEL FILTER VOLTAGE	31 ODD 3-10	3/256	7	126	
SIDE	DJ-97	VEL FILTER VOLTAGE	31 ODD 3-10	3/256	7	127	
SIDE		FILL ZEROS	47 ODD 1-2	128/256	8	0-127	
SIDE	DJ-98	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8	0	
SIDE	DJ-98	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8	1	

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD FRM	BITS	S/MF	SIDE WD	SIDE FRAME	FG BT
SIDE	DJ-98	LECPA STEP VOLTAGE	47 ODD	3-10	20/256	8		2
SIDE	DJ-98	LECPA STEP VOLTAGE	47 ODD	3-10	20/256	8		3
SIDE	DJ-98	LECPA STEP VOLTAGE	47 ODD	3-10	20/256	8		4
SIDE	DJ-98	LECPA STEP VOLTAGE	47 ODD	3-10	20/256	8		5
SIDE	DJ-98	LECPA STEP VOLTAGE	47 ODD	3-10	20/256	8		6
SIDE	DJ-98	LECPA STEP VOLTAGE	47 ODD	3-10	20/256	8		7
SIDE	DJ-98	LECPA STEP VOLTAGE	47 ODD	3-10	20/256	8		8
SIDE	DJ-98	LECPA STEP VOLTAGE	47 ODD	3-10	20/256	8		9
SIDE	DJ-98	LECPA STEP VOLTAGE	47 ODD	3-10	20/256	8		10
SIDE	DJ-98	LECPA STEP VOLTAGE	47 ODD	3-10	20/256	8		11
SIDE	DJ-98	LECPA STEP VOLTAGE	47 ODD	3-10	20/256	8		12
SIDE	DJ-98	LECPA STEP VOLTAGE	47 ODD	3-10	20/256	8		13
SIDE	DJ-98	LECPA STEP VOLTAGE	47 ODD	3-10	20/256	8		14
SIDE	DJ-98	LECPA STEP VOLTAGE	47 ODD	3-10	20/256	8		15
SIDE	DJ-98	LECPA STEP VOLTAGE	47 ODD	3-10	20/256	8		16
SIDE	DJ-98	LECPA STEP VOLTAGE	47 ODD	3-10	20/256	8		17
SIDE	DJ-98	LECPA STEP VOLTAGE	47 ODD	3-10	20/256	8		18
SIDE	DJ-98	LECPA STEP VOLTAGE	47 ODD	3-10	20/256	8		19
SIDE	DJ-99	LECPA STEP VOLTAGE	47 ODD	3-10	20/256	8		20
SIDE	DJ-99	LECPA STEP VOLTAGE	47 ODD	3-10	20/256	8		21
SIDE	DJ-99	LECPA STEP VOLTAGE	47 ODD	3-10	20/256	8		22
SIDE	DJ-99	LECPA STEP VOLTAGE	47 ODD	3-10	20/256	8		23
SIDE	DJ-99	LECPA STEP VOLTAGE	47 ODD	3-10	20/256	8		24
SIDE	DJ-99	LECPA STEP VOLTAGE	47 ODD	3-10	20/256	8		25
SIDE	DJ-99	LECPA STEP VOLTAGE	47 ODD	3-10	20/256	8		26
SIDE	DJ-99	LECPA STEP VOLTAGE	47 ODD	3-10	20/256	8		27
SIDE	DJ-99	LECPA STEP VOLTAGE	47 ODD	3-10	20/256	8		28
SIDE	DJ-99	LECPA STEP VOLTAGE	47 ODD	3-10	20/256	8		29
SIDE	DJ-99	LECPA STEP VOLTAGE	47 ODD	3-10	20/256	8		30
SIDE	DJ-99	LECPA STEP VOLTAGE	47 ODD	3-10	20/256	8		31
SIDE	DJ-99	LECPA STEP VOLTAGE	47 ODD	3-10	20/256	8		32
SIDE	DJ-99	LECPA STEP VOLTAGE	47 ODD	3-10	20/256	8		33
SIDE	DJ-99	LECPA STEP VOLTAGE	47 ODD	3-10	20/256	8		34
SIDE	DJ-99	LECPA STEP VOLTAGE	47 ODD	3-10	20/256	8		35
SIDE	DJ-99	LECPA STEP VOLTAGE	47 ODD	3-10	20/256	8		36

EXP	MEAS		ALSEP		SIDE	SIDE	FG
NAME	NO	MEAS NAME	WD FRM BITS	S/MF	WD	FRAME	BT
SIDE	DJ-99	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		37
SIDE	DJ-99	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		38
SIDE	DJ-99	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		39
SIDE	DF-0	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		40
SIDE	DF-0	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		41
SIDE	DF-0	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		42
SIDE	DF-0	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		43
SIDE	DF-0	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		44
SIDE	DF-0	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		45
SIDE	DF-0	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		46
SIDE	DF-0	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		47
SIDE	DF-0	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		48
SIDE	DF-0	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		49
SIDE	DF-0	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		50
SIDE	DF-0	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		51
SIDE	DF-0	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		52
SIDE	DF-0	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		53
SIDE	DF-0	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		54
SIDE	DF-0	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		55
SIDE	DF-0	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		56
SIDE	DF-0	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		57
SIDE	DF-0	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		58
SIDE	DF-0	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		59
SIDE	DF-1	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		60
SIDE	DF-1	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		61
SIDE	DF-1	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		62
SIDE	DF-1	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		63
SIDE	DF-1	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		64
SIDE	DF-1	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		65
SIDE	DF-1	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		66
SIDE	DF-1	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		67
SIDE	DF-1	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		68
SIDE	DF-1	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		69
SIDE	DF-1	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		70
SIDE	DF-1	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		71

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD	FRM	BITS	S/MF	SIDE WD	SIDE FRAME	FG BT
SIDE	DF-1	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8		72
SIDE	DF-1	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8		73
SIDE	DF-1	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8		74
SIDE	DF-1	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8		75
SIDE	DF-1	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8		76
SIDE	DF-1	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8		77
SIDE	DF-1	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8		78
SIDE	DF-1	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8		79
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8		80
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8		81
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8		82
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8		83
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8		84
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8		85
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8		86
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8		87
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8		88
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8		89
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8		90
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8		91
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8		92
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8		93
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8		94
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8		95
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8		96
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8		97
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8		98
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8		99
SIDE	DF-3	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8		100
SIDE	DF-3	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8		101
SIDE	DF-3	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8		102
SIDE	DF-3	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8		103
SIDE	DF-3	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8		104
SIDE	DF-3	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8		105
SIDE	DF-3	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8		106

EXP	MEAS		ALSEP		SIDE	SIDE	FG
NAME	NO	MEAS NAME	WD FRM BITS	S/MF	WD	FRAME	BT
SIDE	DF-3	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8	107	
SIDE	DF-3	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8	108	
SIDE	DF-3	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8	109	
SIDE	DF-3	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8	110	
SIDE	DF-3	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8	111	
SIDE	DF-3	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8	112	
SIDE	DF-3	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8	113	
SIDE	DF-3	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8	114	
SIDE	DF-3	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8	115	
SIDE	DF-3	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8	116	
SIDE	DF-3	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8	117	
SIDE	DF-3	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8	118	
SIDE	DF-3	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8	119	
SIDE	DF-4	LECPA STEP VOLTAGE	47 ODD 3-10	8/256	8	120	
SIDE	DF-4	LECPA STEP VOLTAGE	47 ODD 3-10	8/256	8	121	
SIDE	DF-4	LECPA STEP VOLTAGE	47 ODD 3-10	8/256	8	122	
SIDE	DF-4	LECPA STEP VOLTAGE	47 ODD 3-10	8/256	8	123	
SIDE	DF-4	LECPA STEP VOLTAGE	47 ODD 3-10	8/256	8	124	
SIDE	DF-4	LECPA STEP VOLTAGE	47 ODD 3-10	8/256	8	125	
SIDE	DF-4	LECPA STEP VOLTAGE	47 ODD 3-10	8/256	8	126	
SIDE	DF-4	LECPA STEP VOLTAGE	47 ODD 3-10	8/256	8	127	
SIDE	DF-5	LE DATA - MSD	56 ODD 1-10	128/256	9	0-127	
SIDE	DF-6	LE DATA - LSD	63 ODD 1-10	128/256	10	0-127	

1.4.1.5.3 SIDE RESET VELOCITY FILTER @9 LISTING

DOWNLINK LISTINGS COLUMN HEADERS

Col.	1	Experiment name.
Col.	2	Measurement number. (An asterisk in col. 11 indicates that the word is subcommed)
Col.	3	Measurement name.
Col.	4	ALSEP main frame (1-64) word. An asterisk in this column indicates that experiment's words are asynchronous with respect to the ALSEP main frame word.
Col.	5	ALSEP frame. The ALSEP frame number as read from the ALSEP frame counter in ALSEP word 3. The ALSEP frame counter counts from 1-89, and then to 0, which represents 90. Columns 46-48 may contain one of the following words: ALL = ALL ALSEP main frames. EVN = Even numbered ALSEP main frames. ODD = Odd numbered ALSEP main frames. An asterisk in this column indicates that this parameter is asynchronous with respect to the ALSEP frames.
Col.	6	Bits. Indicates which of the ten or twenty bits of an ALSEP (1-10) or experiment (1-10 or 1-20) word contain the measurement number given in columns 7-11.
Col.	7	Samples per Main Frame (S/MF). Indicates how often (on the average) a parameter appears in the ALSEP main frame.
Col.	8	Experiment word. For the SIDE these columns indicate the SIDE word number (1-5) For the CPLEE these columns indicate the CPLEE word number (1-32)
Col.	9	Experiment Frame. For the side these columns indicate the SIDE frame number (0-127)
Col.	10	Flag bits

SIDE WORDS 7&8 - RESET @9 FORMAT

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD FRM BITS	S/MF	SIDE WD	SIDE FRAME	FG BT
SIDE		FILL ZEROS	31 ODD 1-2	128/256	7	0-127	
SIDE		FILL ZEROS	47 ODD 1-2	128/256	8	0-127	
SIDE	DI-72	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	0	
SIDE	DI-73	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	1	
SIDE	DI-74	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	2	
SIDE	DI-75	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	3	
SIDE	DI-76	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	4	
SIDE	DI-77	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	5	
SIDE	DI-78	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	6	
SIDE	DI-79	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	7	
SIDE	DI-80	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	8	
SIDE	DI-81	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	9	
SIDE	DI-92	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	10	
SIDE	DI-93	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	11	
SIDE	DI-94	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	12	
SIDE	DI-95	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	13	
SIDE	DI-96	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	14	
SIDE	DI-97	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	15	
SIDE	DI-98	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	16	
SIDE	DI-99	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	17	
SIDE	DJ-0	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	18	
SIDE	DJ-1	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	19	
SIDE	DJ-12	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	20	
SIDE	DJ-13	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	21	
SIDE	DJ-14	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	22	
SIDE	DJ-15	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	23	
SIDE	DJ-16	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	24	
SIDE	DJ-17	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	25	
SIDE	DJ-18	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	26	
SIDE	DJ-19	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	27	
SIDE	DJ-20	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	28	
SIDE	DJ-21	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	29	
SIDE	DJ-32	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	30	
SIDE	DJ-33	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	31	
SIDE	DJ-34	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	32	

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD FRM BITS	S/MF	SIDE WD	SIDE FRAME	FG BT
SIDE	DJ-35	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	33	
SIDE	DJ-36	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	34	
SIDE	DJ-37	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	35	
SIDE	DJ-38	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	36	
SIDE	DJ-39	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	37	
SIDE	DJ-40	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	38	
SIDE	DJ-41	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	39	
SIDE	DJ-52	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	40	
SIDE	DJ-53	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	41	
SIDE	DJ-54	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	42	
SIDE	DJ-55	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	43	
SIDE	DJ-56	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	44	
SIDE	DJ-57	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	45	
SIDE	DJ-58	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	46	
SIDE	DJ-59	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	47	
SIDE	DJ-60	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	48	
SIDE	DJ-61	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	49	
SIDE	DJ-72	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	50	
SIDE	DJ-73	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	51	
SIDE	DJ-74	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	52	
SIDE	DJ-75	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	53	
SIDE	DJ-76	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	54	
SIDE	DJ-77	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	55	
SIDE	DJ-78	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	56	
SIDE	DJ-79	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	57	
SIDE	DJ-80	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	58	
SIDE	DJ-81	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	59	
SIDE	D1-72	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	60	
SIDE	D1-73	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	61	
SIDE	D1-74	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	62	
SIDE	D1-75	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	63	
SIDE	D1-76	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	64	
SIDE	D1-77	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	65	
SIDE	D1-78	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	66	
SIDE	D1-79	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	67	
SIDE	D1-80	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	68	
SIDE	D1-81	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	69	

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EXP NAME	MEAS NO	MEAS NAME	ALSEP WD FRM BITS	S/MF	SIDE WD	SIDE FRAME	FG BT
SIDE	DI-92	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	70	
SIDE	DI-93	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	71	
SIDE	DI-94	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	72	
SIDE	DI-95	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	73	
SIDE	DI-96	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	74	
SIDE	DI-97	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	75	
SIDE	DI-98	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	76	
SIDE	DI-99	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	77	
SIDE	DJ-0	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	78	
SIDE	DJ-1	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	79	
SIDE	DJ-12	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	80	
SIDE	DJ-13	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	81	
SIDE	DJ-14	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	82	
SIDE	DJ-15	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	83	
SIDE	DJ-16	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	84	
SIDE	DJ-17	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	85	
SIDE	DJ-18	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	86	
SIDE	DJ-19	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	87	
SIDE	DJ-20	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	88	
SIDE	DJ-21	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	89	
SIDE	DJ-32	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	90	
SIDE	DJ-33	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	91	
SIDE	DJ-34	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	92	
SIDE	DJ-35	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	93	
SIDE	DJ-36	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	94	
SIDE	DJ-37	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	95	
SIDE	DJ-38	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	96	
SIDE	DJ-39	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	97	
SIDE	DJ-40	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	98	
SIDE	DJ-41	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	99	
SIDE	DJ-52	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	100	
SIDE	DJ-53	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	101	
SIDE	DJ-54	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	102	
SIDE	DJ-55	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	103	
SIDE	DJ-56	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	104	

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EXP NAME	MEAS NO	MEAS NAME	ALSEP WD FRM BITS	S/MF	SIDE WD	SIDE FRAME	FG BT
SIDE	DJ-57	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	105	
SIDE	DJ-58	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	106	
SIDE	DJ-59	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	107	
SIDE	DJ-60	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	108	
SIDE	DJ-61	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	109	
SIDE	DJ-72	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	110	
SIDE	DJ-73	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	111	
SIDE	DJ-74	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	112	
SIDE	DJ-75	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	113	
SIDE	DJ-76	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	114	
SIDE	DJ-77	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	115	
SIDE	DJ-78	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	116	
SIDE	DJ-79	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	117	
SIDE	DJ-80	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	118	
SIDE	DJ-81	VEL FILTER VOLTAGE	31 ODD 3-10	2/256	7	119	
SIDE	DJ-92	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	120	
SIDE	DJ-93	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	121	
SIDE	DJ-94	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	122	
SIDE	DJ-95	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	123	
SIDE	DJ-96	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	124	
SIDE	DJ-97	VEL FILTER VOLTAGE	31 ODD 3-10	3/256	7	125	
SIDE	DJ-97	VEL FILTER VOLTAGE	31 ODD 3-10	3/256	7	126	
SIDE	DJ-97	VEL FILTER VOLTAGE	31 ODD 3-10	3/256	7	127	
SIDE	DJ-98	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8	0	
SIDE	DJ-98	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8	1	
SIDE	DJ-98	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8	2	
SIDE	DJ-98	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8	3	
SIDE	DJ-98	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8	4	
SIDE	DJ-98	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8	5	
SIDE	DJ-98	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8	6	
SIDE	DJ-98	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8	7	
SIDE	DJ-98	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8	8	
SIDE	DJ-98	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8	9	
SIDE	DJ-99	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8	10	
SIDE	DJ-99	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8	11	

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD FRM BITS	S/MF	SIDE WD	SIDE FRAME	FG BT
SIDE	DJ-99	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		12
SIDE	DJ-99	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		13
SIDE	DJ-99	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		14
SIDE	DJ-99	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		15
SIDE	DJ-99	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		16
SIDE	DJ-99	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		17
SIDE	DJ-99	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		18
SIDE	DJ-99	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		19
SIDE	DF-0	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		20
SIDE	DF-0	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		21
SIDE	DF-0	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		22
SIDE	DF-0	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		23
SIDE	DF-0	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		24
SIDE	DF-0	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		25
SIDE	DF-0	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		26
SIDE	DF-0	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		27
SIDE	DF-0	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		28
SIDE	DF-0	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		29
SIDE	DF-1	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		30
SIDE	DF-1	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		31
SIDE	DF-1	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		32
SIDE	DF-1	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		33
SIDE	DF-1	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		34
SIDE	DF-1	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		35
SIDE	DF-1	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		36
SIDE	DF-1	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		37
SIDE	DF-1	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		38
SIDE	DF-1	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		39
SIDE	DF-2	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		40
SIDE	DF-2	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		41
SIDE	DF-2	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		42
SIDE	DF-2	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		43
SIDE	DF-2	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		44
SIDE	DF-2	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		45
SIDE	DF-2	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8		46

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD FRM BITS	S/MF	SIDE WD	SIDE FRAME	FG BT
SIDE	DF-2	LECPA STEP VOLTAGE	47 ODU 3-10	20/256	8		47
SIDE	DF-2	LECPA STEP VOLTAGE	47 ODU 3-10	20/256	8		48
SIDE	DF-2	LECPA STEP VOLTAGE	47 ODU 3-10	20/256	8		49
SIDE	DF-3	LECPA STEP VOLTAGE	47 ODU 3-10	20/256	8		50
SIDE	DF-3	LECPA STEP VOLTAGE	47 ODU 3-10	20/256	8		51
SIDE	DF-3	LECPA STEP VOLTAGE	47 ODU 3-10	20/256	8		52
SIDE	DF-3	LECPA STEP VOLTAGE	47 ODU 3-10	20/256	8		53
SIDE	DF-3	LECPA STEP VOLTAGE	47 ODU 3-10	20/256	8		54
SIDE	DF-3	LECPA STEP VOLTAGE	47 ODU 3-10	20/256	8		55
SIDE	DF-3	LECPA STEP VOLTAGE	47 ODU 3-10	20/256	8		56
SIDE	DF-3	LECPA STEP VOLTAGE	47 ODU 3-10	20/256	8		57
SIDE	DF-3	LECPA STEP VOLTAGE	47 ODU 3-10	20/256	8		58
SIDE	DF-3	LECPA STEP VOLTAGE	47 ODU 3-10	20/256	8		59
SIDE	DJ-98	LECPA STEP VOLTAGE	47 ODU 3-10	20/256	8		60
SIDE	DJ-98	LECPA STEP VOLTAGE	47 ODU 3-10	20/256	8		61
SIDE	DJ-98	LECPA STEP VOLTAGE	47 ODU 3-10	20/256	8		62
SIDE	DJ-98	LECPA STEP VOLTAGE	47 ODU 3-10	20/256	8		63
SIDE	DJ-98	LECPA STEP VOLTAGE	47 ODU 3-10	20/256	8		64
SIDE	DJ-98	LECPA STEP VOLTAGE	47 ODU 3-10	20/256	8		65
SIDE	DJ-98	LECPA STEP VOLTAGE	47 ODU 3-10	20/256	8		66
SIDE	DJ-98	LECPA STEP VOLTAGE	47 ODU 3-10	20/256	8		67
SIDE	DJ-98	LECPA STEP VOLTAGE	47 ODU 3-10	20/256	8		68
SIDE	DJ-98	LECPA STEP VOLTAGE	47 ODU 3-10	20/256	8		69
SIDE	DJ-99	LECPA STEP VOLTAGE	47 ODU 3-10	20/256	8		70
SIDE	DJ-99	LECPA STEP VOLTAGE	47 ODU 3-10	20/256	8		71
SIDE	DJ-99	LECPA STEP VOLTAGE	47 ODU 3-10	20/256	8		72
SIDE	DJ-99	LECPA STEP VOLTAGE	47 ODU 3-10	20/256	8		73
SIDE	DJ-99	LECPA STEP VOLTAGE	47 ODU 3-10	20/256	8		74
SIDE	DJ-99	LECPA STEP VOLTAGE	47 ODU 3-10	20/256	8		75
SIDE	DJ-99	LECPA STEP VOLTAGE	47 ODU 3-10	20/256	8		76
SIDE	DJ-99	LECPA STEP VOLTAGE	47 ODU 3-10	20/256	8		77
SIDE	DJ-99	LECPA STEP VOLTAGE	47 ODU 3-10	20/256	8		78
SIDE	DJ-99	LECPA STEP VOLTAGE	47 ODU 3-10	20/256	8		79
SIDE	DF-0	LECPA STEP VOLTAGE	47 ODU 3-10	20/256	8		80
SIDE	DF-0	LECPA STEP VOLTAGE	47 ODU 3-10	20/256	8		81

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EXP NAME	MEAS NO	MEAS NAME	ALSEP WD FRM BITS	S/MF	SIDE WD	SIDE FRAME	FG BT
SIDE	DF-0	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8	82	
SIDE	DF-0	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8	83	
SIDE	DF-0	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8	84	
SIDE	DF-0	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8	85	
SIDE	DF-0	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8	86	
SIDE	DF-0	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8	87	
SIDE	DF-0	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8	88	
SIDE	DF-0	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8	89	
SIDE	DF-1	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8	90	
SIDE	DF-1	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8	91	
SIDE	DF-1	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8	92	
SIDE	DF-1	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8	93	
SIDE	DF-1	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8	94	
SIDE	DF-1	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8	95	
SIDE	DF-1	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8	96	
SIDE	DF-1	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8	97	
SIDE	DF-1	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8	98	
SIDE	DF-1	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8	99	
SIDE	DF-2	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8	100	
SIDE	DF-2	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8	101	
SIDE	DF-2	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8	102	
SIDE	DF-2	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8	103	
SIDE	DF-2	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8	104	
SIDE	DF-2	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8	105	
SIDE	DF-2	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8	106	
SIDE	DF-2	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8	107	
SIDE	DF-2	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8	108	
SIDE	DF-2	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8	109	
SIDE	DF-3	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8	110	
SIDE	DF-3	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8	111	
SIDE	DF-3	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8	112	
SIDE	DF-3	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8	113	
SIDE	DF-3	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8	114	
SIDE	DF-3	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8	115	
SIDE	DF-3	LECPA STEP VOLTAGE	47 ODD 3-10	20/256	8	116	

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD FRM	BITS	S/MF	SIDE WD	SIDE FRAME	FG BT
SIDE	DF-3	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		117
SIDE	DF-3	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		118
SIDE	DF-3	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		119
SIDE	DF-4	LECPA STEP VOLTAGE	47	ODD 3-10	8/256	8		120
SIDE	DF-4	LECPA STEP VOLTAGE	47	ODD 3-10	8/256	8		121
SIDE	DF-4	LECPA STEP VOLTAGE	47	ODD 3-10	8/256	8		122
SIDE	DF-4	LECPA STEP VOLTAGE	47	ODD 3-10	8/256	8		123
SIDE	DF-4	LECPA STEP VOLTAGE	47	ODD 3-10	8/256	8		124
SIDE	DF-4	LECPA STEP VOLTAGE	47	ODD 3-10	8/256	8		125
SIDE	DF-4	LECPA STEP VOLTAGE	47	ODD 3-10	8/256	8		126
SIDE	DF-4	LECPA STEP VOLTAGE	47	ODD 3-10	8/256	8		127

1.4.2 ACTIVE SEISMIC EXPERIMENT (ASE) TELEMETRY DESCRIPTION

1.4.2.1 ASE Downlink Description

The ASE is downlinked at 10,600 bits per second or ten times the normal data rate. The frame is broken down into 32 twenty-bit words and each word consists of 4 five-bit subwords. The parameters contained in the downlinked frame are described below.

Subwords one and two of ASE word number 1 contain the Frame Sync (DS-17). The sync word (0000111011) is followed by Geophone 2 (DS-2) and Geophone 3 (DS-3) data in subwords 3 and 4 respectively.

The first two subwords in ASE word 2 are Geophone 1 (DS-1) Data. Subword one reads out the Geophone 1 data that was sampled and stored during ASE word number 1. Then in all subsequent ASE words, subwords two, three, and four read out Geophone one, two and three data, respectively.

There are 12 parameters which require eight-bits to convey the data. These parameters are read out in the first subword of two successive ASE words. In each case the last, or 5th bit, of each subword is spare. For instance, the 1st four bits of the RTG Cold Frame Temperature-1 (AR-4) are carried in word 3 and the last four bits are carried in the first four bits of word four, i.e., in each case the first four bits are carried in the odd word and the last four bits are carried in the even.

The Mark Event Measurement (DS-18) appears in word 29, subword 1 when a Real Time Event occurs during the prior frame.

Word Count (DS-19) measures the word in the prior frame during which the Real Time Event occurred. This is read out in ASE word 30.

Event Bit Count (DS-20) measures the bit during which the Real Time Event occurred in the above word in the prior frame. This is read out in ASE Word 31.

The Mode ID (DS-13) is read out in the first 3 bits of subword one of ASE Word 32. Bits 4 and 5 of this subword are not used.

When the ASE is not operating, the following measurements are provided through ALSEP main frame word 33:

Central Station Package Temp.	AS-1
Mortar Box Temp.	AS-2
Grenade Launcher Assembly Temp.	AS-3
Geophone Temp.	AS-4

1.4.2.2 ASE PARAMETER LISTING

DOWNLINK LISTINGS COLUMN HEADERS

- | | |
|--------|---|
| Col. 1 | Transmitting vehicle. |
| Col. 2 | Measurement number. |
| Col. 3 | Measurement name. |
| Col. 4 | Experiment name. |
| Col. 5 | ALSEP-ASE main frame (1-32) word. |
| Col. 6 | ALSEP frame. 00 = all frames. |
| Col. 7 | Bits. Indicates which of the twenty bits (1-20) of an ASE word contain the measurement number given in columns 9-13. |
| Col. 8 | Sub word. Indicates which of the four sub words (1-4) of a 20-bit ASE word contains the measurement number given in columns 9-13. |

REV	TX VEH	MEAS NO	MEASUREMENT NAME	EXP NAME	ASE		BITS	SUB WD
					WD	FM		
ALSEP		DS-17	FRAME SYNC	ASE	01	00	1-5	1
ALSEP		DS-17	FRAME SYNC	ASE	01	00	6-10	2
ALSEP		DS-1	GEOPHONE NO 1	ASE	02	00	1-5	1
ALSEP		DS-1	GEOPHONE NO 1	ASE	2-32	00	6-10	2
ALSEP		DS-2	GEOPHONE NO 2	ASE	ALL	00	11-15	3
ALSEP		DS-3	GEOPHONE NO 3	ASE	ALL	00	16-20	4
ALSEP		AR-4	RTG COLD FRM TEMP 1	ASE	03	00	1-5	1
ALSEP		AR-4	RTG COLD FRM TEMP 1	ASE	04	00	1-5	1
ALSEP		DS-7	PITCH ANGLE	ASE	05	00	1-5	1
ALSEP		DS-7	PITCH ANGLE	ASE	06	00	1-5	1
ALSEP		DS-5	GROUND MONITOR VOLTS	ASE	07	00	1-5	1
ALSEP		DS-5	GROUND MONITOR VOLTS	ASE	08	00	1-5	1
ALSEP		DS-6	ROLL ANGLE	ASE	09	00	1-5	1
ALSEP		DS-6	ROLL ANGLE	ASE	10	00	1-5	1
ALSEP			NOT USED	ASE	11	00	1-5	1
ALSEP			NOT USED	ASE	12	00	1-5	1
ALSEP		AS-3	GRENAD E LAUNCH ASS T	ASE	13	00	1-5	1
ALSEP		AS-3	GRENAD E LAUNCH ASS T	ASE	14	00	1-5	1
ALSEP		DS-8	GEOPHONE CAL PULSE	ASE	15	00	1-5	1
ALSEP		DS-8	GEOPHONE CAL PULSE	ASE	16	00	1-5	1
ALSEP		DS-11	A/D CAL 3.75V	ASE	17	00	1-5	1
ALSEP		DS-11	A/D CAL 3.75V	ASE	18	00	1-5	1
ALSEP		DS-10	A/D CAL 1.25V	ASE	19	00	1-5	1
ALSEP		DS-10	A/D CAL 1.25V	ASE	20	00	1-5	1
ALSEP		AS-1	CENTRAL STA PKGE T	ASE	21	00	1-5	1
ALSEP		AS-1	CENTRAL STA PKGE T	ASE	22	00	1-5	1
ALSEP		AE-3	CONVERTER INPUT VOLT	ASE	23	00	1-5	1
ALSEP		AE-3	CONVERTER INPUT VOLT	ASE	24	00	1-5	1
ALSEP		AE-4	INPUT CURRENT	ASE	25	00	1-5	1
ALSEP		AE-4	INPUT CURRENT	ASE	26	00	1-5	1
ALSEP		AR-1	RTG HOT FRM TEMP 1	ASE	27	00	1-5	1
ALSEP		AR-1	RTG HOT FRM TEMP 1	ASE	28	00	1-5	1
ALSEP		DS-18	MARK EVENT	ASE	29	00	1-5	1
ALSEP		DS-19	WORD COUNT	ASE	30	00	1-5	1
ALSEP		DS-20	EVENT BIT COUNT	ASE	31	00	1-5	1
ALSEP		DS-13	MODE ID	ASE	32	00	1-5	1

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APPENDIX C
APOLLO 15 - ALSEP 2

This appendix has been taken from the *Data Acquisition Plan, Annex B-1, ALSEP Telemetry Data Format Control Book*, prepared by Philco-Ford, Houston Operations, July 1972. Modifications to this material were made by Lockheed Electronics Company, Inc.

- 1.2 ALSEP 2, ARRAY A-2, APOLLO 15
- 1.2.1 NORMAL/SLOW PCM TELEMETRY DESCRIPTION
- 1.2.1.1 GENERAL DESCRIPTION
- 1.2.1.1.1 Downlink Data Rates

APOLLO LUNAR SURFACE EXPERIMENTS PACKAGE (ALSEP) PCM Telemetry is downlinked at either a normal or slow data rate as shown below. The downlinked bit rate is selectable upon Earth command.

Normal Data Rate	Slow Data Rate
. 1060 bits/sec	. 530 bits/sec
. 10 bits/word	. 10 bits/word
. 64 words/frame	. 64 words/frame
. 640 bits/frame	. 640 bits/frame
. 0.943 ms/bit	. 1.887 ms/bit
. 9.43 ms/word	. 18.87 ms/word
. 603.773 ms/frame	. 1.21 sec/frame
. Data are transmitted MSB first (Bit 1).	

The major subsystems included in ALSEP ARRAY A-2 are:

I. Data System (CONT)	5 words
A. Control	
B. Command Verification	
C. Housekeeping	
II. Passive Seismic Experiment (PSE)	42 words
*III. Lunar Surface Magnetometer (LSM)	7 words
*IV. Solar Wind Spectrometer Experiment (SWS)	4 words
V. Suprathermal Ion Detector Experiment (SIDE)	5 words
VI. Heat Flow Experiment (HFE)	1 word

	64 words total

*SWS and LSM data will not appear on any ARCSAV tapes after June 14, 1974.

1.2.1.1.2 ALSEP ARRAY A-2 MAIN FRAME WORD ASSIGNMENTS

1 CONT.	2 CONT.	3 CONT.	4 PSE	5 LSM	6 PSE	7 SWS	8 PSE
9 PSE	10 PSE	11 PSE	12 PSE	13 PSE	14 PSE	15 SIDE	16 PSE
17 LSM	18 PSE	19 LSM	20 PSE	21 LSM	22 PSE	23 SWS	24 HFE
25 PSE	26 PSE	27 PSE	28 PSE	29 PSE	30 PSE	31 SIDE	32 PSE
33 HOUSE-KEEPING	34 PSE	35 PSE	36 PSE	37 PSE	38 PSE	39 SWS	40 PSE
41 PSE	42 PSE	43 PSE	44 PSE	45 PSE	46 COMMAND VERIFICATION	47 SIDE	48 PSE
49 LSM	50 PSE	51 LSM	52 PSE	53 LSM	54 PSE	55 SWS	56 SIDE
57 PSE	58 PSE	59 PSE	60 PSE	61 PSE	62 PSE	63 SIDE	64 PSE

Each box contains one 10-bit word.

Total bits per frame--10 x 64 = 640 bits.

1.2.1.1.3 ALSEP MAIN FRAME PARAMETER LISTING

DOWNLINK LISTINGS COLUMN HEADERS

Col. 1 Experiment name.

Col. 2 Measurement number. (An asterisk indicates that the word is subcommand)

Col. 3 Measurement name.

Col. 4 ALSEP main frame (1-64) word. An asterisk in this column indicates that experiment's words are asynchronous with respect to the ALSEP main frame word.

Col. 5 ALSEP frame. The ALSEP frame number as read from the ALSEP frame counter in ALSEP word 3. The ALSEP frame counter counts from 1-89, and then to 0, which represents 90. Columns 46-48 may contain one of the following words:

- ALL = ALL ALSEP main frames
- EVN = Even numbered ALSEP main frames
- ODD = Odd numbered ALSEP main frames.

An asterisk in this column indicates that this parameter is asynchronous with respect to the ALSEP frame.

Col. 6 Bits. Indicates which of the ten bits (1-10) of an ALSEP or experiment word contain the measurement number given in column 2.

Col. 7 Samples per Main Frame (S/MF). Indicates how often (on the average) a parameter appears in the ALSEP main frame.

Col. 1	Col. 2	Col. 3	Col. 4	Col. 5	Col. 6	Col. 7

EX. NAME	MEAS NO	MEAS NAME	ALSEP WD FRM	BITS	S/MF
CONT	DA-1A	SYNC (1110001001)	1	ALL 1-10	1
CONT	DA-1B	SYNC (0000111011)	2	ALL 1-10	1
CONT	WD03*	SYNC, CTR, AND ID	3	ALL 1-10	1
PSE	DL-8	SP SEISMIC Z	4	ALL 1-10	28
LSM	WD05*	ENGR MEASUREMENTS	5	ALL 1-10	1
PSE	DL-8	SP SEISMIC Z	6	ALL 1-10	28
SWS	WD07*	SWS WORDS (0-185)	7	ALL 1-10	4
PSE	DL-8	SP SEISMIC Z	8	ALL 1-10	28
PSE	DL-1	LP SEISMIC X	9	ALL 1-10	4
PSE	DL-8	SP SEISMIC Z	10	ALL 1-10	28
PSE	DL-2	LP SEISMIC Y	11	ALL 1-10	4
PSE	DL-8	SP SEISMIC Z	12	ALL 1-10	28
PSE	DL-3	LP SEISMIC Z	13	ALL 1-10	4
PSE	DL-8	SP SEISMIC Z	14	ALL 1-10	28
SIDE	WD15*	SIDE WORD 1 OR 6	15	ALL 1-10	1
PSE	DL-8	SP SEISMIC Z	16	ALL 1-10	28
LSM	DM-25	X-AXIS FIELD	17	ALL 1-10	2
PSE	DL-8	SP SEISMIC Z	18	ALL 1-10	28
LSM	JM-26	Y-AXIS FIELD	19	ALL 1-10	2
PSE	JL-8	SP SEISMIC Z	20	ALL 1-10	28
LSM	DM-27	Z-AXIS FIELD	21	ALL 1-10	2
PSE	DL-8	SP SEISMIC Z	22	ALL 1-10	28
SWS	WD23*	SWS WORDS (0-185)	23	ALL 1-10	4
HFE	WD24*	HEAT FLOW (0-3)	24	ALL 1-10	1
PSE	DL-1	LP SEISMIC X	25	ALL 1-10	4
PSE	DL-8	SP SEISMIC Z	26	ALL 1-10	28
PSE	JL-2	LP SEISMIC Y	27	ALL 1-10	4
PSE	DL-8	SP SEISMIC Z	28	ALL 1-10	28
PSE	DL-3	LP SEISMIC Z	29	ALL 1-10	4
PSE	DL-8	SP SEISMIC Z	30	ALL 1-10	28
SIDE	WD31*	SIDE WORD 2 OR 7	31	ALL 1-10	1
PSE	DL-8	SP SEISMIC Z	32	ALL 1-10	28
CONT	WD33*	HOUSEKEEPING	33	ALL 1-10	1
PSE	DL-8	SP SEISMIC Z	34	ALL 1-10	28
PSE	WD35*	TIDAL X OR Z	35	ALL 1-10	1

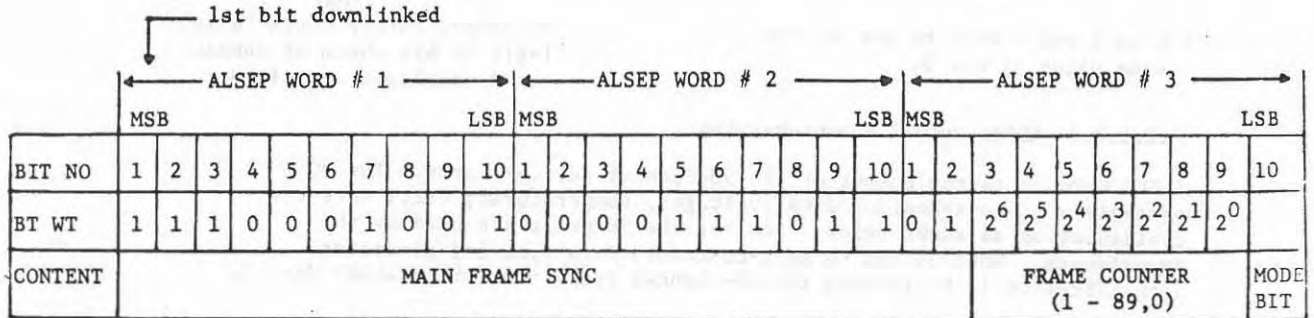
EXP NAME	MEAS NO	MEAS NAME	ALSEP WD FRM	BITS	S/MF
PSE	DL-8	SP SEISMIC Z	36	ALL 1-10	28
PSE	WD37*	TIDAL Y OR SENSOR UNIT TEMP	37	ALL 1-10	1
PSE	DL-8	SP SEISMIC Z	38	ALL 1-10	28
SWS	WD39*	SWS WORDS (0-185)	39	ALL 1-10	4
PSE	DL-8	SP SEISMIC Z	40	ALL 1-10	28
PSE	DL-1	LP SEISMIC X	41	ALL 1-10	4
PSE	DL-8	SP SEISMIC Z	42	ALL 1-10	28
PSE	DL-2	LP SEISMIC Y	43	ALL 1-10	4
PSE	DL-8	SP SEISMIC Z	44	ALL 1-10	28
PSE	DL-3	LP SEISMIC Z	45	ALL 1-10	4
CONT	WD46*	CMD VERIFY & CAP WD	46	ALL 1-10	1
SIDE	WD47*	SIDE WORD 3 OR 8	47	ALL 1-10	1
PSE	DL-8	SP SEISMIC Z	48	ALL 1-10	28
LSM	DM-25	X-AXIS FIELD	49	ALL 1-10	2
PSE	DL-8	SP SEISMIC Z	50	ALL 1-10	28
LSM	DM-26	Y-AXIS FIELD	51	ALL 1-10	2
PSE	DL-8	SP SEISMIC Z	52	ALL 1-10	28
LSM	DM-27	Z-AXIS FIELD	53	ALL 1-10	2
PSE	DL-8	SP SEISMIC Z	54	ALL 1-10	28
SWS	WD55*	SWS WORDS (0-185)	55	ALL 1-10	4
SIDE	WD56*	SIDE WORD 4 OR 9	56	ALL 1-10	1
PSE	DL-1	LP SEISMIC X	57	ALL 1-10	4
PSE	DL-8	SP SEISMIC Z	58	ALL 1-10	28
PSE	DL-2	LP SEISMIC Y	59	ALL 1-10	4
PSE	DL-8	SP SEISMIC Z	60	ALL 1-10	28
PSE	DL-3	LP SEISMIC Z	61	ALL 1-10	4
PSE	DL-8	SP SEISMIC Z	62	ALL 1-10	28
SIDE	WD63*	SIDE WORD 5 OR 10	63	ALL 1-10	1
PSE	DL-8	SP SEISMIC Z	64	ALL 1-10	28

1.2.1.2 ALSEP ARRAY A-2 SYSTEM CONTROL WORDS (CONT)

Control and support of the ALSEP system is monitored through 5 main frame ALSEP words: 1, 2, 3, 33 and 46.

1.2.1.2.1 ALSEP Words 1, 2, and 3

The first 22-bits included in words 1, 2, and 3 contain the main frame sync. Bits 3 through 9 of ALSEP Word 3 contains the frame counter used to identify the parameters output by the 90-channel subcommutator. The frame counter counts from 1-89 then resets to 0 upon reaching the 90th channel. Loss of synchronization between the frame counter and 90 channel subcommutator may cause up to 54 seconds of invalid data. Bit-10 of Word 3 is the Mode Bit, which identifies Bit Rate or ALSEP ID on designated frames according to the frame counter. The configuration of the three words is as shown below:



- FRM MODE BIT
- 1 : 1 = Normal Data Rate
 - 2 : 1 = Slow Data Rate
 - 3 : 0 (MSB) ALSEP ARRAY A-2
 - 4 : 1 Data Proc.
 - 5 : 1 (LSB) Serial No.

Mode Bit = 0 for all other frames.

1.2.1.2.2 ALSEP WORD46 - Command Verification Word

Command Verification is provided in ALSEP Word 46. The configuration is shown below. Bits 3 through 9 reflect the 7-bit command as received by the ALSEP, and bit-10 is a message acceptance pulse (MAP). The MAP reads out a "1" when an error check has been successful and a command has been acted upon. The Command Verification Word reads zeroes except during the one ALSEP main frame following receipt of a command.

1st bit downlinked

	MSB									LSB
BIT NO	1	2	3	4	5	6	7	8	9	10
CONTENT	*	*	COMMAND RECEIVED							↑

* Bits 1 and 2 will be set to the same value as bit 3.

MAP:
 0=Command Parity Check Failed
 1=Bit by bit check of command and complement verified

1.2.1.2.3 ALSEP Word33 - Housekeeping

ALSEP Word 33 is the output of the 90-channel subcommutator. The 90 parameters of housekeeping data (voltages, temperatures, etc.) have the configuration as shown below. Some of the channels are used by the experiments. Word 33 has no self-contained data sync and parameter identification is by reading the 90-channel frame counter in ALSEP Word 3.

1st bit downlinked

	MSB									
BIT NO	1	2	3	4	5	6	7	8	9	10
CONTENT	0	0	Digital Analog Housekeeping Data							

1.2.1.2.4 CONT PARAMETER LISTING

DOWNLINK LISTING COLUMN HEADERS

- Col. 1 Experiment name.
- Col. 2 Measurement number. (An asterisk indicates that the word is sub-
commented)
- Col. 3 Measurement name.
- Col. 4 ALSEP main frame (1-64) word. An asterisk in this column indicates
that experiment's words are asynchronous with respect to the ALSEP
main frame word.
- Col. 5 ALSEP frame. The ALSEP frame number as read from the ALSEP frame
counter in ALSEP word 3. The ALSEP frame counter counts from
1-89, and then to 0, which represents 90. Columns 46-48 may
contain one of the following words:

ALL = All ALSEP main frames
EVN = Even numbered ALSEP main frames
ODD = Odd numbered ALSEP main frames.

An asterisk in this column indicates that this parameter is
asynchronous with respect to the ALSEP frame.
- Col. 6 Bits. Indicates which of the ten bits (1-10) of an ALSEP or
experiment word contain the measurement number given in column 2.
- Col. 7 Samples per Main Frame (S/MF). Indicates how often (on the average)
a parameter appears in the ALSEP main frame.

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD	FRM	BITS	S/MF
CONT	DA-1A	SYNC (1110001001)	1	ALL	1-10	1
CONT	DA-1B	SYNC (0000111011)	2	ALL	1-10	1
CONT	DA-1C	SYNC (01)	3	ALL	1-2	1
CONT	DA-2	FRAME COUNTER (1-89,0)	3	ALL	3-9	1
CONT	DA-3A	MODE,BIT RATE ID (1=NORMAL)	3	1	10	1/90
CONT	DA-3B	MODE,BIT RATE ID (1=SLOW)	3	2	10	1/90
CONT	DA-4A	MODE,ALSEP ID (0) (MSB)	3	3	10	1/90
CONT	DA-4B	MODE,ALSEP ID (1)	3	4	10	1/90
CONT	DA-4C	MODE,ALSEP ID (1) (LSB)	3	5	10	1/90
CONT		MODE,FILL ZERO	3	6-0	10	85/90
CONT	DA-7	FILL ZEROS	33	ALL	1-2	1
CONT	AE-3	CONV INPUT VOLT.	33	1	3-10	1/90
CONT	AE-1	ADC CAL 0.25V	33	2	3-10	1/90
CONT	AE-2	ADC CAL 4.75V	33	3	3-10	1/90
CONT	AT-3	THERMAL PLATE-1 TEMP	33	4	3-10	1/90
CONT	AE-4	CONV INPUT CUR	33	5	3-10	1/90
CONT	AR-1	HOT FRAME-1 TEMP	33	6	3-10	1/90
CONT	AR-4	COLD FRAME-1 TEMP	33	7	3-10	1/90
CONT	AE-5	SHUNT REG-1 CUR	33	8	3-10	1/90
CONT	AB-1	RCVR .1KHZ SC PRES	33	9	3-10	1/90
CONT	AZ-1	TIME 18 HR BISTATIC	33	10	3-10	1/90
CONT	AZ-2	TIMER 1 1/2 MONTH # 1	33	11	3-10	1/90
CONT	AB-4	PD, EXP # 1&2	33	12	3-10	1/90
CONT	AE-6	SHUNT REG-2 CUR	33	13	3-10	1/90
CONT	AB-5	PD, EXP # 3&4 & DSS HTR 2	33	14	3-10	1/90
CONT	AT-10	BOTTOM STRUCTURE-3 TEMP	33	15	3-10	1/90
CONT	AT-21	LOCAL OSC. CRYSTAL A TEMP	33	16	3-10	1/90
CONT	AT-22	LOCAL OSC. CRYSTAL B TEMP	33	17	3-10	1/90
CONT	AT-23	XMTR A CRYSTAL TEMP	33	18	3-10	1/90
CONT	AT-24	XMTR A HEAT SINK TEMP	33	19	3-10	1/90
CONT	AE-7	PCU OUT VOLT-1(29V)	33	20	3-10	1/90
CONT	AE-13	RCVR.PRE-LIMIT. LEV	33	21	3-10	1/90
CONT	AE-18	XMTR. A CURRENT	33	22	3-10	1/90
CONT	AL-1	L.P.AMPL.GAIN(X&Y)	33	23	3-10	1/90

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD	FRM	BITS	S/MF
CONT	AL-5	LEV.MODE&CRS.SENS.MODE	33	24	3-10	1/90
CONT	AB-6	DATA PROCESSOR X ON/OFF 02	33	25	3-10	1/90
CONT	AX-5	#2 CELL OUT (IRRAD. FILTER)	33	26	3-10	1/90
CONT	AT-1	SUNSHIELD-1 TEMP	33	27	3-10	1/90
CONT	AT-4	THERMAL PLATE-2 TEMP	33	28	3-10	1/90
CONT	AH-1	SUPPLY VOLT NO. 1	33	29	3-10	1/90
CONT	AX-2	CELL TEMP.	33	30	3-10	1/90
CONT	AT-25	XMTR B CRYSTAL TEMP	33	31	3-10	1/90
CONT	AT-26	XMTR B HEAT SINK TEMP	33	32	3-10	1/90
CONT	AT-27	ANALOG DP, BASE TEMP	33	33	3-10	1/90
CONT	AT-28	ANALOG DP, INT TEMP	33	34	3-10	1/90
CONT	AE-8	PCU OUT VOLT-2(15V)	33	35	3-10	1/90
CONT	AE-14	RCVR.LOCAL OSC LEV	33	36	3-10	1/90
CONT	AR-2	HOT FRAME-2 TEMP	33	37	3-10	1/90
CONT	AL-2	L.P.AMPL.GAIN(Z)	33	38	3-10	1/90
CONT	AL-6	THERM.CTL.STAT.	33	39	3-10	1/90
CONT	AE-6	SHUNT REG-2 CUR	33	40	3-10	1/90
CONT	AX-6	#3 CELL OUT (FILTER)	33	41	3-10	1/90
CONT	AT-2	SUNSHIELD-2 TEMP	33	42	3-10	1/90
CONT	AT-5	THERMAL PLATE-3 TEMP	33	43	3-10	1/90
CONT	AE-5	SHUNT REG-1 CUR	33	44	3-10	1/90
CONT	AH-2	SUPPLY VOLT NO. 2	33	45	3-10	1/90
CONT	AT-29	DIGITAL DP, BASE TEMP	33	46	3-10	1/90
CONT	AT-30	DIGITAL DP, INT TEMP	33	47	3-10	1/90
CONT	AT-31	CMD DECODER, BASE TEMP	33	48	3-10	1/90
CONT	AT-32	CMD DECODER, INT TEMP	33	49	3-10	1/90
CONT	AE-9	PCU OUT VOLT-3(12V)	33	50	3-10	1/90
CONT	AE-15	XMTR. A, RF, POWER	33	51	3-10	1/90
CONT	AR-3	HOT FRAME-3 TEMP	33	52	3-10	1/90
CONT	AL-3	LEV.DIR&SPEED	33	53	3-10	1/90
CONT	AL-7	CAL.STAT.L.P.&S.P.	33	54	3-10	1/90
CONT	AH-3	SUPPLY VOLT NO. 3	33	55	3-10	1/90
CONT	AX-3	OUTER TEMP.	33	56	3-10	1/90
CONT	AH-6	HIGH COND. HEATER POWER STATUS	33	57	3-10	1/90
CONT	AT-6	THERMAL PLATE-4 TEMP	33	58	3-10	1/90

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD	FRM	BITS	S/MF
CONT	AT-8	LEFT SIDE STRUCTURE-1 TEMP	33	59	3-10	1/90
CONT	AT-12	INNER MULTILAYER INS TEMP	33	60	3-10	1/90
CONT	AT-33	CMD DEMOD VCO TEMP	33	61	3-10	1/90
CONT	AT-34	PDU, BASE TEMP	33	62	3-10	1/90
CONT	AT-35	PDU, INT TEMP	33	63	3-10	1/90
CONT	AT-36	PCU, POWER OSC-1 TEMP	33	64	3-10	1/90
CONT	AE-10	PCU OUT VOLT-4(5V)	33	65	3-10	1/90
CONT	AE-16	XMTR. B RF, POWER	33	66	3-10	1/90
CONT	AR-5	COLD FRAME-2 TEMP	33	67	3-10	1/90
CONT	AL-4	S.P.AMPL.GAIN(Z)	33	68	3-10	1/90
CONT	AL-8	UNCAGE STATUS	33	69	3-10	1/90
CONT	AI-1	LOW ENG DETECT CT.RT	33	70	3-10	1/90
CONT	AT-7	THERMAL PLATE-5 TEMP	33	71	3-10	1/90
CONT	AT-13	OUTER MULTILAYER INS TEMP	33	72	3-10	1/90
CONT		UNASSIGNED	33	73	3-10	
CONT	AH-4	SUPPLY VOLT NO. 4	33	74	3-10	1/90
CONT	AH-7	LOW COND. HEATER POWER STATUS	33	75	3-10	1/90
CONT	AT-37	PCU, POWER OSC-2 TEMP	33	76	3-10	1/90
CONT	AT-38	PCU, REGULATOR-1 TEMP	33	77	3-10	1/90
CONT	AT-39	PCU, REGULATOR-2 TEMP	33	78	3-10	1/90
CONT	AE-11	PCU, OUT VOLT-5(-12V)	33	79	3-10	1/90
CONT	AE-12	PCU, OUT VOLT-6(-6V)	33	80	3-10	1/90
CONT	AE-17	XMTR. A, CURRENT	33	81	3-10	1/90
CONT	AK-6	COLD FRAME-3	33	82	3-10	1/90
CONT	AX-1	INNER TEMP.	33	83	3-10	1/90
CONT	AX-4	#1 CELL OUT (BARE)	33	84	3-10	1/90
CONT	AI-2	HI ENG DETECT CT.RT	33	85	3-10	1/90
CONT	AZ-3	TIMER 1 1/2 MONTH # 2	33	86	3-10	1/90
CONT	AT-9	RIGHT SIDE STRUCTURE-2 TEMP	33	87	3-10	1/90
CONT	AT-11	BACK STRUCTURE-4 TEMP	33	88	3-10	1/90
CONT		UNASSIGNED	33	89	3-10	
CONT		UNASSIGNED	33	0	3-10	
CONT	DA-7	FILL ZEROS	46	ALL	1-2	1
CONT	DA-5	RECVD CMD MESSAGE	46	ALL	3-9	1
CONT	DA-6	CMD MAP	46	ALL	10	1

1.2.1.3 PASSIVE SEISMIC EXPERIMENT (PSE)

1.2.1.3.1 PSE DOWNLINK DESCRIPTION

Scientific Measurements

8 PSE scientific parameters are output in 4 ALSEP main frame words. The PSE words are 10-bits of digital converted analog data.

S.P. Z-axis data is supercommutated into 29 of the main frame words.

L.P. X-axis data, L.P. Y-axis data, and L.P. Z-axis data are supercommutated into 4 main frame words each (total of 12 main frame words).

Two main frame words, 35 and 37, contain 2-channel subcommutators. Content of the main frame words is identified by the LSB of the 90-channel frame counter in ALSEP Word 3, as follows:

LSB	ALSEP FRAME	ALSEP WORD	CONTENT
"0"	Even	35	Tidal X-Axis
"0"	Even	37	Tidal Y-Axis
"1"	Odd	35	Tidal Z-Axis
"1"	Odd	37	Sensor Unit Temp

Engineering Status

There are 8 parameters of 8-bit housekeeping data which are read out in ALSEP Word 33.

1.2.1.3.2 PSE PARAMETER LISTING

DOWNLINK LISTINGS COLUMN HEADERS

- Col. 1 Experiment name.
- Col. 2 Measurement number. (An asterisk in col. 11 indicates that the word is subcommand)
- Col. 3 Measurement name.
- Col. 4 ALSEP main frame (1-64) word. An asterisk in this column indicates that experiment's words are asynchronous with respect to the ALSEP main frame word.
- Col. 5 ALSEP frame. The ALSEP frame number as read from the ALSEP frame counter in ALSEP word 3. The ALSEP frame counter counts from 1-89, and then to 0, which represents 90. Columns 46-48 may contain one of the following words:
- ALL = All ALSEP main frames
 - EVN = Even numbered ALSEP main frames
 - ODD = Odd numbered ALSEP main frames.
- An asterisk in this column indicates that this parameter is asynchronous with respect to the ALSEP frame.
- Col. 6 Bits. Indicates which of the ten bits (1-10) of an ALSEP or experiment word contain the measurement number given in columns 7-11.
- Col. 7 Samples per Main Frame (S/MF). Indicates how often (on the average) a parameter appear in the ALSEP main frame.
- Col. 8 Experiment word. For the LSM these columns indicate the LSM word number (1-16)
For the SIDE these columns indicate the SIDE word number (1-10)
For the SWS these columns indicate the SWS word number (0-185)
- Col. 9 Experiment Frame. For the SWS these columns indicate the SWS sequence number (0-15)
For the SIDE these columns indicate the SIDE frame number (0-127)
- Col. 10 Flag bits.

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD	FRM	BITS	S/MF	EXPERIMENT WD	FRAME	FG BT
PSE	DL-8	SP SEISMIC Z	4	ALL	1-10	28			
PSE	DL-8	SP SEISMIC Z	6	ALL	1-10	28			
PSE	DL-8	SP SEISMIC Z	8	ALL	1-10	28			
PSE	DL-1	LP SEISMIC X	9	ALL	1-10	4			
PSE	DL-8	SP SEISMIC Z	10	ALL	1-10	28			
PSE	DL-2	LP SEISMIC Y	11	ALL	1-10	4			
PSE	DL-8	SP SEISMIC Z	12	ALL	1-10	28			
PSE	DL-3	LP SEISMIC Z	13	ALL	1-10	4			
PSE	DL-8	SP SEISMIC Z	14	ALL	1-10	28			
PSE	DL-8	SP SEISMIC Z	16	ALL	1-10	28			
PSE	DL-8	SP SEISMIC Z	18	ALL	1-10	28			
PSE	DL-8	SP SEISMIC Z	20	ALL	1-10	28			
PSE	DL-8	SP SEISMIC Z	22	ALL	1-10	28			
PSE	DL-1	LP SEISMIC X	25	ALL	1-10	4			
PSE	DL-8	SP SEISMIC Z	26	ALL	1-10	28			
PSE	DL-2	LP SEISMIC Y	27	ALL	1-10	4			
PSE	DL-8	SP SEISMIC Z	28	ALL	1-10	28			
PSE	DL-3	LP SEISMIC Z	29	ALL	1-10	4			
PSE	DL-8	SP SEISMIC Z	30	ALL	1-10	28			
PSE	DL-8	SP SEISMIC Z	32	ALL	1-10	28			
PSE	DL-8	SP SEISMIC Z	34	ALL	1-10	28			
PSE	DL-4	TIDAL X	35	EVN	1-10	1/2			
PSE	DL-6	TIDAL Z	35	ODD	1-10	1/2			
PSE	DL-8	SP SEISMIC Z	36	ALL	1-10	28			
PSE	DL-5	TIDAL Y	37	EVN	1-10	1/2			
PSE	DL-7	SENSOR UNIT TEMP	37	ODD	1-10	1/2			
PSE	DL-8	SP SEISMIC Z	38	ALL	1-10	28			
PSE	DL-8	SP SEISMIC Z	40	ALL	1-10	28			
PSE	DL-1	LP SEISMIC X	41	ALL	1-10	4			
PSE	DL-8	SP SEISMIC Z	42	ALL	1-10	28			
PSE	DL-2	LP SEISMIC Y	43	ALL	1-10	4			
PSE	DL-8	SP SEISMIC Z	44	ALL	1-10	28			
PSE	DL-3	LP SEISMIC Z	45	ALL	1-10	4			
PSE	DL-8	SP SEISMIC Z	48	ALL	1-10	28			
PSE	DL-8	SP SEISMIC Z	50	ALL	1-10	28			
PSE	DL-8	SP SEISMIC Z	52	ALL	1-10	28			
PSE	DL-8	SP SEISMIC Z	54	ALL	1-10	28			
PSE	DL-1	LP SEISMIC X	57	ALL	1-10	4			
PSE	DL-8	SP SEISMIC Z	58	ALL	1-10	28			
PSE	DL-2	LP SEISMIC Y	59	ALL	1-10	4			
PSE	DL-8	SP SEISMIC Z	60	ALL	1-10	28			
PSE	DL-3	LP SEISMIC Z	61	ALL	1-10	4			
PSE	DL-8	SP SEISMIC Z	62	ALL	1-10	28			
PSE	DL-8	SP SEISMIC Z	64	ALL	1-10	28			

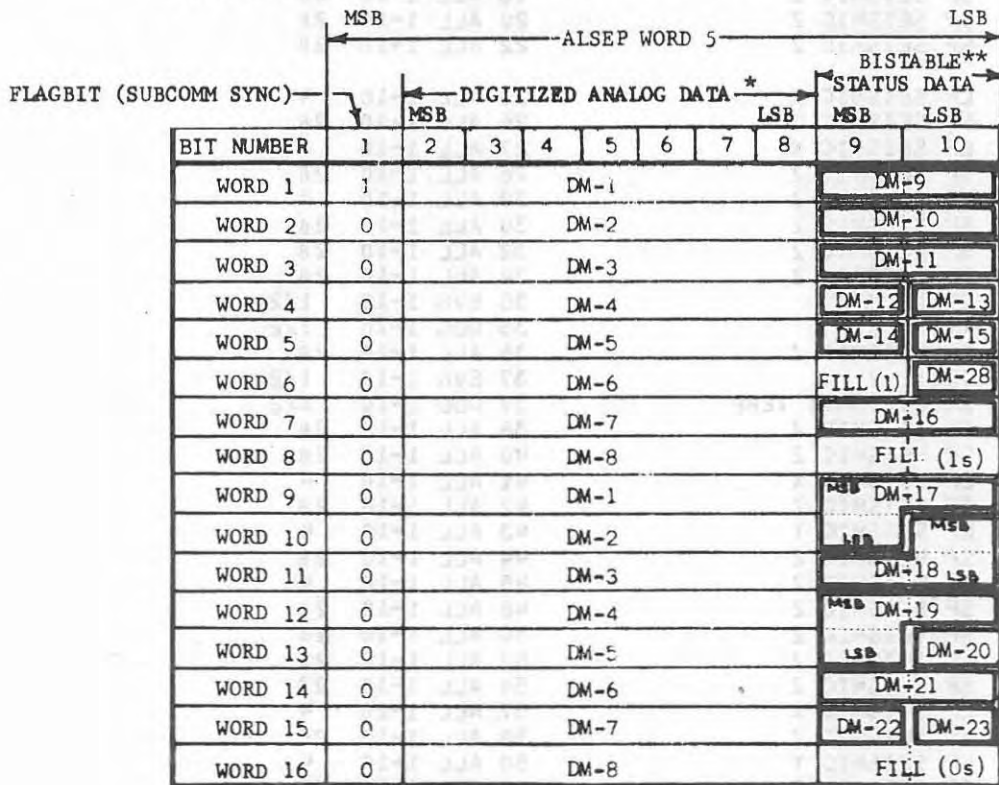
1.2.1.4 Lunar Surface Magnetometer Experiment (LSM)

1.2.1.4.1 LSM Downlink Description

The LSM is allotted words 5, 17, 19, 21, 49, 51, and 53 in the ALSEP main frame. ALSEP word 5 provides LSM engineering status, and the remaining six ALSEP words provide LSM scientific data.

Engineering Measurements

ALSEP word 5 carries a 16 channel subcomm (words 1 - 16). Since this subcomm is asynchronous with respect to the ALSEP frame count, a flagbit, to be used for subcomm sync, is placed in bit one of each word. The format of ALSEP word five is given below:

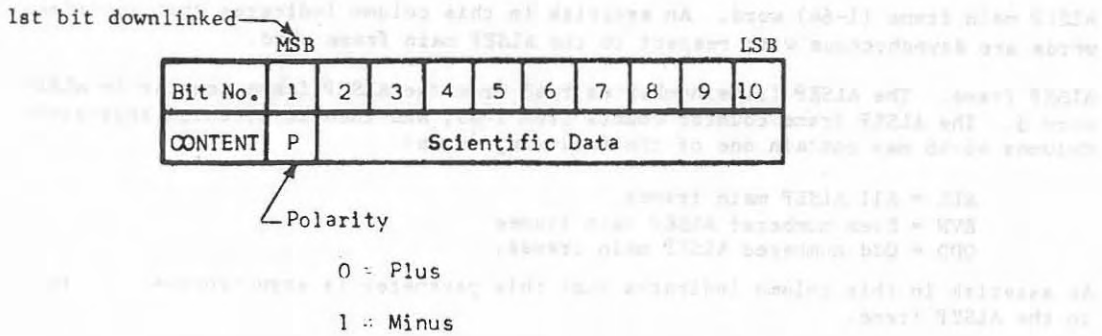


* Words 9-16 are a repeat of Words 1-8.

** 1-bit parameters show 2 states, "0" or "1"
 2-bit parameters show up to 4 states, "00" thru "11"
 3-bit parameters show up to 8 states, "000" thru "111"

Scientific Measurements

Three scientific measurements, the X-axis, Y-axis, and Z-axis measurements are supercommutated into ALSEP words 17, 19, and 21 and ALSEP words 49, 51, and 53, respectively. The bit configuration of these measurements is shown below.



1.2.1.4.2 LSM PARAMETER LISTING

DOWNLINK LISTINGS COLUMN HEADERS

Col.	1	Experiment name.
Col.	2	Measurement number. (An asterisk in col. 11 indicates that the word is subcommand)
Col.	3	Measurement name.
Col.	4	ALSEP main frame (1-64) word. An asterisk in this column indicates that experiment's words are asynchronous with respect to the ALSEP main frame word.
Col.	5	ALSEP frame. The ALSEP frame number as read from the ALSEP frame counter in ALSEP word 3. The ALSEP frame counter counts from 1-89, and then to 0, which represents 90. Columns 46-48 may contain one of the following words: ALL = All ALSEP main frames EVN = Even numbered ALSEP main frames ODD = Odd numbered ALSEP main frames. An asterisk in this column indicates that this parameter is asynchronous with respect to the ALSEP frame.
Col.	6	Bits. Indicates which of the ten bits (1-10) of an ALSEP or experiment word contain the measurement number given in columns 7-11.
Col.	7	Samples per Main Frame (S/MF). Indicates how often (on the average) a parameter appears in the ALSEP main frame.
Col.	8	Experiment word. For the LSM these columns indicate the LSM word number (1-16) For the SIDE these columns indicate the SIDE word number (1-10) For the SWS these columns indicate the SWS word number (0-185)
Col.	9	Experiment Frame. For the SWS these columns indicate the SWS sequence number (0-15) For the SIDE these columns indicate the SIDE frame number (0-127)
Col.	10	Flag bits.

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD	FRM	BITS	S/MF	LSM WD	LSM FRAME	FG BT
LSM	DM-1	TEMP-1	5	*	2-8	2/16	1		1
LSM	DM-9	X-FLIP POSITION	5	*	9-10	1/16	1		1
LSM	DM-2	TEMP-2	5	*	2-8	2/16	2		0
LSM	DM-10	Y-FLIP POSITION	5	*	9-10	1/16	2		0
LSM	DM-3	TEMP-3	5	*	2-8	2/16	3		0
LSM	DM-11	Z-FLIP POSITION	5	*	9-10	1/16	3		0
LSM	DM-4	TEMP-4	5	*	2-8	2/16	4		0
LSM	DM-12	X-GIMBAL POSITION	5	*	9	1/16	4		0
LSM	DM-13	Y-GIMBAL POSITION	5	*	10	1/16	4		0
LSM	DM-5	TEMP-5	5	*	2-8	2/16	5		0
LSM	DM-14	Z-GIMBAL POSITION	5	*	9	1/16	5		0
LSM	DM-15	THERMAL CONTROL SELECT	5	*	10	1/16	5		0
LSM	DM-6	LEVEL SENSOR-1	5	*	2-8	2/16	6		0
LSM		FILLER BITS (1)	5	*	9	1/16	6		0
LSM	DM-28	HEATER POWER STATUS	5	*	10	1/16	6		0
LSM	DM-7	LEVEL SENSOR-2	5	*	2-8	2/16	7		0
LSM	DM-16	MEASUREMENT RANGE	5	*	9-10	1/16	7		0
LSM	DM-8	SUPPLY VOLTAGE	5	*	2-8	2/16	8		0
LSM	DM-29	FILLER BITS (ONES)	5	*	9-10	1/16	8		0
LSM	DM-1	TEMP-1	5	*	2-8	2/16	9		0
LSM	DM-17	X-OFFSET FIELD	5	*	9-10	1/16	9		0
LSM	DM-2	TEMP-2	5	*	2-8	2/16	10		0
LSM	DM-17	X-OFFSET FIELD	5	*	9	1/16	10		0
LSM	DM-18	Y-OFFSET FIELD	5	*	10	1/16	10		0
LSM	DM-3	TEMP-3	5	*	2-8	2/16	11		0
LSM	DM-18	Y-OFFSET FIELD	5	*	9-10	1/16	11		0
LSM	DM-4	TEMP-4	5	*	2-8	2/16	12		0
LSM	DM-19	Z-OFFSET FIELD	5	*	9-10	1/16	12		0
LSM	DM-5	TEMP-5	5	*	2-8	2/16	13		0
LSM	DM-19	Z-OFFSET FIELD	5	*	9	1/16	13		0
LSM	DM-20	MODE STATE	5	*	10	1/16	13		0
LSM	DM-6	LEVEL SENSOR-1	5	*	2-8	2/16	14		0
LSM	DM-21	OFFSET ADDRESS	5	*	9-10	1/16	14		0
LSM	DM-7	LEVEL SENSOR-2	5	*	2-8	2/16	15		0
LSM	DM-22	FILTER IN/OUT	5	*	9	1/16	15		0
LSM	DM-23	FLIP/CAL INHIBIT STATUS	5	*	10	1/16	15		0
LSM	DM-8	SUPPLY VOLTAGE	5	*	2-8	2/16	16		0
LSM	DM-24	FILLER BITS (ZEROS)	5	*	9-10	1/16	16		0
LSM	DM-25	X-AXIS FIELD	17	ALL	1-10	2			
LSM	DM-26	Y-AXIS FIELD	19	ALL	1-10	2			
LSM	DM-27	Z-AXIS FIELD	21	ALL	1-10	2			
LSM	DM-25	X-AXIS FIELD	49	ALL	1-10	2			
LSM	DM-26	Y-AXIS FIELD	51	ALL	1-10	2			
LSM	DM-27	Z-AXIS FIELD	53	ALL	1-10	2			

1.2-18

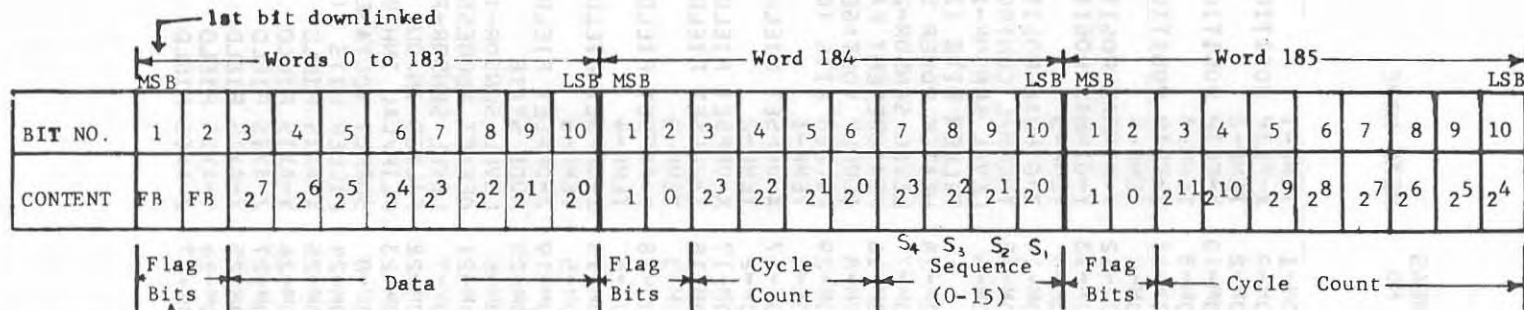
1.2.1.5 SOLAR WIND SPECTROMETER (SWS)

1.2.1.5.1 SWS DOWNLINK DESCRIPTION

The SWS is allotted words 7, 23, 39, and 55 in the ALSEP main frame. These words form a four word supercommutation of the SWS data. The format of the SWS data is as follows:

4 SWS words = 1 ALSEP main frame
 186 SWS words = 1 SWS sequence = 46.5 ALSEP main frames
 16 SWS sequences = 1 SWS cycle = 744 ALSEP main frames

Since SWS data is asynchronous with respect to ALSEP frame and word, ID data is provided in SWS words 184 and 185 of each sequence. Word 184 contains a four bit sequence counter. A Cycle Counter is contained in words 184 and 185. The Cycle Counter will advance once for 16 sequences. When the Cycle Counter in Word 184 is full it will carry over into Word 185. All SWS words have two flag bits in the two MSB positions. The formats of a normal SWS word and words 184 and 185 are given below:



Scientific Data = 00
 Calibration Data = 01

The format of the SWS sequences are as follows:

- (1) SWS Words 0 through 111 and 128 through 183 are identical in sequences 0 through 13. Sequences 14 and 15 are identical to sequences 0 through 13 with the exception of words 0, 8, 16, 24,, 104, 128, 136,, 176. In sequence 14 these words contain DC calibration data. In sequence 15 these words contain AC calibration data.
- (2) SWS words 112 through 119 read out A/D calibration data on even sequences and engineering data on odd sequences.
- (3) SWS words 120 through 127 read out current calibration data which steps to a different level each sequence for four sequences, then recycles.

The following pages show Matrices for Sequences 0 through 13, 14, and 15.

Word	Seq 0	Seq 1	Seq 2	Seq 3	Seq 4	Seq 5	Seq 6	Seq 7	Seq 8	Seq 9	Seq 10	Seq 11	Seq 12	Seq 13	Seq 14	Seq 15
0
8
16
24
104
128
136
176

SOLAR WIND SPECTROMETER (SWS) MEASUREMENTS - SEQUENCES 0 - 13

PROTON FLUX

Voltage Level #1	0	1	2	3	4	5	6	7
	DY-1	DY-2	DY-3	DY-4	DY-5	DY-6	DY-7	DY-8
2	8	9	10	11	12	13	14	15
	DY-9	DY-10	DY-11	DY-12	DY-13	DY-14	DY-15	DY-16
3	16	17	18	19	20	21	22	23
	DY-17	DY-18	DY-19	DY-20	DY-21	DY-22	DY-23	DY-24
4	24	25	26	27	28	29	30	31
	DY-25	DY-26	DY-27	DY-28	DY-29	DY-30	DY-31	DY-32
5	32	33	34	35	36	37	38	39
	DY-33	DY-34	DY-35	DY-36	DY-37	DY-38	DY-39	DY-40
6	40	41	42	43	44	45	46	47
	DY-41	DY-42	DY-43	DY-44	DY-45	DY-46	DY-47	DY-48
7	48	49	50	51	52	53	54	55
	DY-49	DY-50	DY-51	DY-52	DY-53	DY-54	DY-55	DY-56
8	56	57	58	59	60	61	62	63
	DY-57	DY-58	DY-59	DY-60	DY-61	DY-62	DY-63	DY-64
9	64	65	66	67	68	69	70	71
	DY-65	DY-66	DY-67	DY-68	DY-69	DY-70	DY-71	DY-72
10	72	73	74	75	76	77	78	79
	DY-73	DY-74	DY-75	DY-76	DY-77	DY-78	DY-79	DY-80
11	80	81	82	83	84	85	86	87
	DY-81	DY-82	DY-83	DY-84	DY-85	DY-86	DY-87	DY-88
12	88	89	90	91	92	93	94	95
	DY-89	DY-90	DY-91	DY-92	DY-93	DY-94	DY-95	DY-96
13	96	97	98	99	100	101	102	103
	DZ-1	DZ-2	DZ-3	DZ-4	DZ-5	DZ-6	DZ-7	DZ-8
14	104	105	106	107	108	109	110	111
	DZ-9	DZ-10	DZ-11	DZ-12	DZ-13	DZ-14	DZ-15	DZ-16

C-22

1.2-21

Engineering Data

A/D CALIBRATION

112	113	114	115	116	117	118	119	S ₁
DW-3	DW-4	DW-5	DW-6	DW-7	DW-3	DW-5	DW-7	0
112	113	114	115	116	117	118	119	S ₁
DW-11	DW-12	DW-13	DW-14	DW-15	DW-16	DW-17	DW-18	1

CURRENT CALIBRATION

120	121	122	123	124	125	126	127	S ₂	S ₁
DW-19	DW-20	DW-21	DW-22	DW-23	DW-24	DW-25	DW-26	0	0
120	121	122	123	124	125	126	127	S ₂	S ₁
DW-27	DW-28	DW-29	DW-30	DW-31	DW-32	DW-33	DW-34	0	1
120	121	122	123	124	125	126	127	S ₂	S ₁
DW-35	DW-36	DW-37	DW-38	DW-39	DW-40	DW-41	DW-42	1	0
120	121	122	123	124	125	126	127	S ₂	S ₁
DW-43	DW-44	DW-45	DW-46	DW-47	DW-48	DW-49	DW-50	1	1

ELECTRON FLUX

Voltage Level	128	129	130	131	132	133	134	135	
15	DZ-17	DZ-18	DZ-19	DZ-20	DZ-21	DZ-22	DZ-23	DZ-24	
16	136	137	138	139	140	141	142	143	
	DZ-25	DZ-26	DZ-27	DZ-28	DZ-29	DZ-30	DZ-31	DZ-32	
17	144	145	146	147	148	149	150	151	
	DZ-33	DZ-34	DZ-35	DZ-36	DZ-37	DZ-38	DZ-39	DZ-40	
18	152	153	154	155	156	157	158	159	
	DZ-41	DZ-42	DZ-43	DZ-44	DZ-45	DZ-46	DZ-47	DZ-48	
19	160	161	162	163	164	165	166	167	
	DZ-49	DZ-50	DZ-51	DZ-52	DZ-53	DZ-54	DZ-55	DZ-56	
20	168	169	170	171	172	173	174	175	
	DZ-57	DZ-58	DZ-59	DZ-60	DZ-61	DZ-62	DZ-63	DZ-64	
21	176	177	178	179	180	181	182	183	
	DZ-65	DZ-66	DZ-67	DZ-68	DZ-69	DZ-70	DZ-71	DZ-72	
								184	185
								DW-1	DW-2

SYNC & ID

SOLAR WIND SPECTROMETER (SWS) MEASUREMENTS- SEQUENCE 14

PROTON FLUX

Voltage Level #1	0	1	2	3	4	5	6	7
	DW-51	DY-2	DY-3	DY-4	DY-5	DY-6	DY-7	DY-8
2	8	9	10	11	12	13	14	15
	DW-52	DY-10	DY-11	DY-12	DY-13	DY-14	DY-15	DY-16
3	16	17	18	19	20	21	22	23
	DW-53	DY-18	DY-19	DY-20	DY-21	DY-22	DY-23	DY-24
4	24	25	26	27	28	29	30	31
	DW-54	DY-26	DY-27	DY-28	DY-29	DY-30	DY-31	DY-32
5	32	33	34	35	36	37	38	39
	DW-55	DY-34	DY-35	DY-36	DY-37	DY-38	DY-39	DY-40
6	40	41	42	43	44	45	46	47
	DW-56	DY-42	DY-43	DY-44	DY-45	DY-46	DY-47	DY-48
7	48	49	50	51	52	53	54	55
	DW-57	DY-50	DY-51	DY-52	DY-53	DY-54	DY-55	DY-56
8	56	57	58	59	60	61	62	63
	DW-58	DY-58	DY-59	DY-60	DY-61	DY-62	DY-63	DY-64
9	64	65	66	67	68	69	70	71
	DW-59	DY-66	DY-67	DY-68	DY-69	DY-70	DY-71	DY-72
10	72	73	74	75	76	77	78	79
	DW-60	DY-74	DY-75	DY-76	DY-77	DY-78	DY-79	DY-80
11	80	81	82	83	84	85	86	87
	DW-61	DY-82	DY-83	DY-84	DY-85	DY-86	DY-87	DY-88
12	88	89	90	91	92	93	94	95
	DW-62	DY-90	DY-91	DY-92	DY-93	DY-94	DY-95	DY-96
13	96	97	98	99	100	101	102	103
	DW-63	DZ-2	DZ-3	DZ-4	DZ-5	DZ-6	DZ-7	DZ-8
14	104	105	106	107	108	109	110	111
	DW-64	DZ-10	DZ-11	DZ-12	DZ-13	DZ-14	DZ-15	DZ-16

ENGINEERING DATA

112	113	114	115	116	117	118	119
DW-3	DW-4	DW-5	DW-6	DW-7	DW-3	DW-5	DW-7

CURRENT CALIBRATION DATA

120	121	122	123	124	125	126	127
DW-35	DW-36	DW-37	DW-38	DW-39	DW-40	DW-41	DW-42

Voltage Level

ELECTRON FLUX

15	128	129	130	131	132	133	134	135
	DW-65	DZ-18	DZ-19	DZ-20	DZ-21	DZ-22	DZ-23	DZ-24
16	136	137	138	139	140	141	142	143
	DW-66	DZ-26	DZ-27	DZ-28	DZ-29	DZ-30	DZ-31	DZ-32
17	144	145	146	147	148	149	150	151
	DW-67	DZ-34	DZ-35	DZ-36	DZ-37	DZ-38	DZ-39	DZ-40
18	152	153	154	155	156	157	158	159
	DW-68	DZ-42	DZ-43	DZ-44	DZ-45	DZ-46	DZ-47	DZ-48
19	160	161	162	163	164	165	166	167
	DW-69	DZ-50	DZ-51	DZ-52	DZ-53	DZ-54	DZ-55	DZ-56
20	168	169	170	171	172	173	174	175
	DW-70	DZ-58	DZ-59	DZ-60	DZ-61	DZ-62	DZ-63	DZ-64
21	176	177	178	179	180	181	182	183
	DW-71	DZ-66	DZ-67	DZ-68	DZ-69	DZ-70	DZ-71	DZ-72

SYNC & ID

184 185

C-23

1.2-22

1.2.1.5.2 SWS PARAMETER LISTING

DOWNLINK LISTINGS COLUMN HEADERS

- Col. 1 Experiment name.
- Col. 2 Measurement number. (An asterisk in col. 11 indicates that the word is subcommand)
- Col. 3 Measurement name.
- Col. 4 ALSEP main frame (1-64) word. An asterisk in this column indicates that experiment's words are asynchronous with respect to the ALSEP main frame word.
- Col. 5 ALSEP frame. The ALSEP frame number as read from the ALSEP frame counter in ALSEP word 3. The ALSEP frame counter counts from 1-89, and then to 0, which represents 90. Columns 46-48 may contain one of the following words:
- ALL = All ALSEP main frames
 EVN = Even numbered ALSEP main frames
 ODD = Odd numbered ALSEP main frames.
- An asterisk in this column indicates that this parameter is asynchronous with respect to the ALSEP frame.
- Col. 6 Bits. Indicates which of the ten bits (1-10) of an ALSEP or experiment word contain the measurement number given in columns 7-11.
- Col. 7 Samples per Main Frame (S/MF). Indicates how often (on the average) a parameter appears in the ALSEP main frame.
- Col. 8 Experiment word. For the LSM these columns indicate the LSM word number (1-16)
 For the SIDE these columns indicate the SIDE word number (1-10)
 For the SWS these columns indicate the SWS word number (0-185)
- Col. 9 Experiment Frame. For the SWS these columns indicate the SWS sequence number (0-15)
 For the SIDE these columns indicate the SIDE frame number (0-127)
- Col. 10 Flag bits.

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD	FRM	BITS	S/MF	SWS WD	SWS SEQ	FG BT
SWS	WD07*	SWS WORDS (0-185)	7	ALL	1-10	1			
SWS	WD23*	SWS WORDS (0-185)	23	ALL	1-10	1			
SWS	WD39*	SWS WORDS (0-185)	39	ALL	1-10	1			
SWS	WD55*	SWS WORDS (0-185)	55	ALL	1-10	1			
SWS	DY-1	POS IONS-SUM-LEV 1	*	*	3-10	14/744	0	0-13	00
SWS	DW-51	DC HV CAL LEV-1 PROT	*	*	3-10	1/744	0	14	01
SWS	DW-72	AC HV CAL LEV-1 PROT	*	*	3-10	1/744	0	15	01
SWS	DY-2	POS IONS CUP-1 LEV-1	*	*	3-10	16/744	1	0-15	00
SWS	DY-3	POS IONS CUP-2 LEV-1	*	*	3-10	16/744	2	0-15	00
SWS	DY-4	POS IONS CUP-3 LEV-1	*	*	3-10	16/744	3	0-15	00
SWS	DY-5	POS IONS CUP-4 LEV-1	*	*	3-10	16/744	4	0-15	00
SWS	DY-6	POS IONS CUP-5 LEV-1	*	*	3-10	16/744	5	0-15	00
SWS	DY-7	POS IONS CUP-6 LEV-1	*	*	3-10	16/744	6	0-15	00
SWS	DY-8	POS IONS CUP-7 LEV-1	*	*	3-10	16/744	7	0-15	00
SWS	DY-9	POS IONS-SUM-LEV 2	*	*	3-10	14/744	8	0-13	00
SWS	DW-52	DC HV CAL LEV-2 PROT	*	*	3-10	1/744	8	14	01
SWS	DW-73	AC HV CAL LEV-2 PROT	*	*	3-10	1/744	8	15	01
SWS	DY-10	POS IONS CUP-1 LEV-2	*	*	3-10	16/744	9	0-15	00
SWS	DY-11	POS IONS CUP-2 LEV-2	*	*	3-10	16/744	10	0-15	00
SWS	DY-12	POS IONS CUP-3 LEV-2	*	*	3-10	16/744	11	0-15	00
SWS	DY-13	POS IONS CUP-4 LEV-2	*	*	3-10	16/744	12	0-15	00
SWS	DY-14	POS IONS CUP-5 LEV-2	*	*	3-10	16/744	13	0-15	00
SWS	DY-15	POS IONS CUP-6 LEV-2	*	*	3-10	16/744	14	0-15	00
SWS	DY-16	POS IONS CUP-7 LEV-2	*	*	3-10	16/744	15	0-15	00
SWS	DY-17	POS IONS-SUM-LEV 3	*	*	3-10	14/744	16	0-13	00
SWS	DW-53	DC HV CAL LEV-3 PROT	*	*	3-10	1/744	16	14	01
SWS	DW-74	AC HV CAL LEV-3 PROT	*	*	3-10	1/744	16	15	01
SWS	DY-18	POS IONS CUP-1 LEV-3	*	*	3-10	16/744	17	0-15	00
SWS	DY-19	POS IONS CUP-2 LEV-3	*	*	3-10	16/744	18	0-15	00
SWS	DY-20	POS IONS CUP-3 LEV-3	*	*	3-10	16/744	19	0-15	00
SWS	DY-21	POS IONS CUP-4 LEV-3	*	*	3-10	16/744	20	0-15	00
SWS	DY-22	POS IONS CUP-5 LEV-3	*	*	3-10	16/744	21	0-15	00
SWS	DY-23	POS IONS CUP-6 LEV-3	*	*	3-10	16/744	22	0-15	00
SWS	DY-24	POS IONS CUP-7 LEV-3	*	*	3-10	16/744	23	0-15	00
SWS	DY-25	POS IONS-SUM-LEV 4	*	*	3-10	14/744	24	0-13	00

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD	FRM	BITS	S/MF	SWS WD	SWS SEQ	FG BT
SWS	DW-54	DC HV CAL LEV-4 PROT	*	*	3-10	1/744	24	14	01
SWS	DW-75	AC HV CAL LEV-4 PROT	*	*	3-10	1/744	24	15	01
SWS	DY-26	POS IONS CUP-1 LEV-4	*	*	3-10	16/744	25	0-15	00
SWS	DY-27	POS IONS CUP-2 LEV-4	*	*	3-10	16/744	26	0-15	00
SWS	DY-28	POS IONS CUP-3 LEV-4	*	*	3-10	16/744	27	0-15	00
SWS	DY-29	POS IONS CUP-4 LEV-4	*	*	3-10	16/744	28	0-15	00
SWS	DY-30	POS IONS CUP-5 LEV-4	*	*	3-10	16/744	29	0-15	00
SWS	DY-31	POS IONS CUP-6 LEV-4	*	*	3-10	16/744	30	0-15	00
SWS	DY-32	POS IONS CUP-7 LEV-4	*	*	3-10	16/744	31	0-15	00
SWS	DY-33	POS IONS-SUM-LEV 5	*	*	3-10	14/744	32	0-13	00
SWS	DW-55	DC HV CAL LEV-5 PROT	*	*	3-10	1/744	32	14	01
SWS	DW-76	AC HV CAL LEV-5 PROT	*	*	3-10	1/744	32	15	01
SWS	DY-34	POS IONS CUP-1 LEV-5	*	*	3-10	16/744	33	0-15	00
SWS	DY-35	POS IONS CUP-2 LEV-5	*	*	3-10	16/744	34	0-15	00
SWS	DY-36	POS IONS CUP-3 LEV-5	*	*	3-10	16/744	35	0-15	00
SWS	DY-37	POS IONS CUP-4 LEV-5	*	*	3-10	16/744	36	0-15	00
SWS	DY-38	POS IONS CUP-5 LEV-5	*	*	3-10	16/744	37	0-15	00
SWS	DY-39	POS IONS CUP-6 LEV-5	*	*	3-10	16/744	38	0-15	00
SWS	DY-40	POS IONS CUP-7 LEV-5	*	*	3-10	16/744	39	0-15	00
SWS	DY-41	POS IONS-SUM-LEV 6	*	*	3-10	14/744	40	0-13	00
SWS	DW-56	DC HV CAL LEV-6 PROT	*	*	3-10	1/744	40	14	01
SWS	DW-77	AC HV CAL LEV-6 PROT	*	*	3-10	1/744	40	15	01
SWS	DY-42	POS IONS CUP-1 LEV-6	*	*	3-10	16/744	41	0-15	00
SWS	DY-43	POS IONS CUP-2 LEV-6	*	*	3-10	16/744	42	0-15	00
SWS	DY-44	POS IONS CUP-3 LEV-6	*	*	3-10	16/744	43	0-15	00
SWS	DY-45	POS IONS CUP-4 LEV-6	*	*	3-10	16/744	44	0-15	00
SWS	DY-46	POS IONS CUP-5 LEV-6	*	*	3-10	16/744	45	0-15	00
SWS	DY-47	POS IONS CUP-6 LEV-6	*	*	3-10	16/744	46	0-15	00
SWS	DY-48	POS IONS CUP-7 LEV-6	*	*	3-10	16/744	47	0-15	00
SWS	DY-49	POS IONS-SUM-LEV 7	*	*	3-10	14/744	48	0-13	00
SWS	DW-57	DC HV CAL LEV-7 PROT	*	*	3-10	1/744	48	14	01
SWS	DW-78	AC HV CAL LEV-7 PROT	*	*	3-10	1/744	48	15	01
SWS	DY-50	POS IONS CUP-1 LEV-7	*	*	3-10	16/744	49	0-15	00
SWS	DY-51	POS IONS CUP-2 LEV-7	*	*	3-10	16/744	50	0-15	00
SWS	DY-52	POS IONS CUP-3 LEV-7	*	*	3-10	16/744	51	0-15	00

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD	FRM	BITS	S/MF	SWS WD	SWS SEQ	FG BT
SWS	DY-53	POS IONS CUP-4 LEV-7	*	*	3-10	16/744	52	0-15	00
SWS	DY-54	POS IONS CUP-5 LEV-7	*	*	3-10	16/744	53	0-15	00
SWS	DY-55	POS IONS CUP-6 LEV-7	*	*	3-10	16/744	54	0-15	00
SWS	DY-56	POS IONS CUP-7 LEV-7	*	*	3-10	16/744	55	0-15	00
SWS	DY-57	POS IONS-SUM-LEV 8	*	*	3-10	14/744	56	0-13	00
SWS	DW-58	DC HV CAL LEV-8 PROT	*	*	3-10	1/744	56	14	01
SWS	DW-79	AC HV CAL LEV-8 PROT	*	*	3-10	1/744	56	15	01
SWS	DY-58	POS IONS CUP-1 LEV-8	*	*	3-10	16/744	57	0-15	00
SWS	DY-59	POS IONS CUP-2 LEV-8	*	*	3-10	16/744	58	0-15	00
SWS	DY-60	POS IONS CUP-3 LEV-8	*	*	3-10	16/744	59	0-15	00
SWS	DY-61	POS IONS CUP-4 LEV-8	*	*	3-10	16/744	60	0-15	00
SWS	DY-62	POS IONS CUP-5 LEV-8	*	*	3-10	16/744	61	0-15	00
SWS	DY-63	POS IONS CUP-6 LEV-8	*	*	3-10	16/744	62	0-15	00
SWS	DY-64	POS IONS CUP-7 LEV-8	*	*	3-10	16/744	63	0-15	00
SWS	DY-65	POS IONS-SUM-LEV 9	*	*	3-10	14/744	64	0-13	00
SWS	DW-59	DC HV CAL LEV-9 PROT	*	*	3-10	1/744	64	14	01
SWS	DW-80	AC HV CAL LEV-9 PROT	*	*	3-10	1/744	64	15	01
SWS	DY-66	POS IONS CUP-1 LEV-9	*	*	3-10	16/744	65	0-15	00
SWS	DY-67	POS IONS CUP-2 LEV-9	*	*	3-10	16/744	66	0-15	00
SWS	DY-68	POS IONS CUP-3 LEV-9	*	*	3-10	16/744	67	0-15	00
SWS	DY-69	POS IONS CUP-4 LEV-9	*	*	3-10	16/744	68	0-15	00
SWS	DY-70	POS IONS CUP-5 LEV-9	*	*	3-10	16/744	69	0-15	00
SWS	DY-71	POS IONS CUP-6 LEV-9	*	*	3-10	16/744	70	0-15	00
SWS	DY-72	POS IONS CUP-7 LEV-9	*	*	3-10	16/744	71	0-15	00
SWS	DY-73	POS IONS-SUM-LEV 10	*	*	3-10	14/744	72	0-13	00
SWS	DW-60	DC HV CAL LEV-10 PROT	*	*	3-10	1/744	72	14	01
SWS	DW-81	AC HV CAL LEV-10 PROT	*	*	3-10	1/744	72	15	01
SWS	DY-74	POS IONS CUP-1 LEV-10	*	*	3-10	16/744	73	0-15	00
SWS	DY-75	POS IONS CUP-2 LEV-10	*	*	3-10	16/744	74	0-15	00
SWS	DY-76	POS IONS CUP-3 LEV-10	*	*	3-10	16/744	75	0-15	00
SWS	DY-77	POS IONS CUP-4 LEV-10	*	*	3-10	16/744	76	0-15	00
SWS	DY-78	POS IONS CUP-5 LEV-10	*	*	3-10	16/744	77	0-15	00
SWS	DY-79	POS IONS CUP-6 LEV-10	*	*	3-10	16/744	78	0-15	00
SWS	DY-80	POS IONS CUP-7 LEV-10	*	*	3-10	16/744	79	0-15	00
SWS	DY-81	POS IONS-SUM-LEV 11	*	*	3-10	14/744	80	0-13	00

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD	FRM	BITS	S/MF	SWS WD	SWS SEQ	FG BT
SWS	DW-61	DC HV CAL LEV-11 PROT	*	*	3-10	1/744	80	14	01
SWS	DW-82	AC HV CAL LEV-11 PROT	*	*	3-10	1/744	80	15	01
SWS	DY-82	POS IONS CUP-1 LEV-11	*	*	3-10	16/744	81	0-15	00
SWS	DY-83	POS IONS CUP-2 LEV-11	*	*	3-10	16/744	82	0-15	00
SWS	DY-84	POS IONS CUP-3 LEV-11	*	*	3-10	16/744	83	0-15	00
SWS	DY-85	POS IONS CUP-4 LEV-11	*	*	3-10	16/744	84	0-15	00
SWS	DY-86	POS IONS CUP-5 LEV-11	*	*	3-10	16/744	85	0-15	00
SWS	DY-87	POS IONS CUP-6 LEV-11	*	*	3-10	16/744	86	0-15	00
SWS	DY-88	POS IONS CUP-7 LEV-11	*	*	3-10	16/744	87	0-15	00
SWS	DY-89	POS IONS-SUM-LEV 12	*	*	3-10	14/744	88	0-13	00
SWS	DW-62	DC HV CAL LEV-12 PROT	*	*	3-10	1/744	88	14	01
SWS	DW-83	AC HV CAL LEV-12 PROT	*	*	3-10	1/744	88	15	01
SWS	DY-90	POS IONS CUP-1 LEV-12	*	*	3-10	16/744	89	0-15	00
SWS	DY-91	POS IONS CUP-2 LEV-12	*	*	3-10	16/744	90	0-15	00
SWS	DY-92	POS IONS CUP-3 LEV-12	*	*	3-10	16/744	91	0-15	00
SWS	DY-93	POS IONS CUP-4 LEV-12	*	*	3-10	16/744	92	0-15	00
SWS	DY-94	POS IONS CUP-5 LEV-12	*	*	3-10	16/744	93	0-15	00
SWS	DY-95	POS IONS CUP-6 LEV-12	*	*	3-10	16/744	94	0-15	00
SWS	DY-96	POS IONS CUP-7 LEV-12	*	*	3-10	16/744	95	0-15	00
SWS	DZ-1	POS IONS-SUM-LEV 13	*	*	3-10	14/744	96	0-13	00
SWS	DW-63	DC HV CAL LEV-13 PROT	*	*	3-10	1/744	96	14	01
SWS	DW-84	AC HV CAL LEV-13 PROT	*	*	3-10	1/744	96	15	01
SWS	DZ-2	POS IONS CUP-1 LEV-13	*	*	3-10	16/744	97	0-15	00
SWS	DZ-3	POS IONS CUP-2 LEV-13	*	*	3-10	16/744	98	0-15	00
SWS	DZ-4	POS IONS CUP-3 LEV-13	*	*	3-10	16/744	99	0-15	00
SWS	DZ-5	POS IONS CUP-4 LEV-13	*	*	3-10	16/744	100	0-15	00
SWS	DZ-6	POS IONS CUP-5 LEV-13	*	*	3-10	16/744	101	0-15	00
SWS	DZ-7	POS IONS CUP-6 LEV-13	*	*	3-10	16/744	102	0-15	00
SWS	DZ-8	POS IONS CUP-7 LEV-13	*	*	3-10	16/744	103	0-15	00
SWS	DZ-9	POS IONS-SUM-LEV 14	*	*	3-10	14/744	104	0-13	00
SWS	DW-64	DC HV CAL LEV-14 PROT	*	*	3-10	1/744	104	14	01
SWS	DW-85	AC HV CAL LEV-14 PROT	*	*	3-10	1/744	104	15	01
SWS	DZ-10	POS IONS CUP-1 LEV-14	*	*	3-10	16/744	105	0-15	00
SWS	DZ-11	POS IONS CUP-2 LEV-14	*	*	3-10	16/744	106	0-15	00
SWS	DZ-12	POS IONS CUP-3 LEV-14	*	*	3-10	16/744	107	0-15	00

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD FRM	BITS	S/MF	SWS WD	SWS SEQ	FG BT
SWS	DZ-13	POS IONS CUP-4 LEV-14	*	3-10	16/744	108	0-15	00
SWS	DZ-14	POS IONS CUP-5 LEV-14	*	3-10	16/744	109	0-15	00
SWS	DZ-15	POS IONS CUP-6 LEV-14	*	3-10	16/744	110	0-15	00
SWS	DZ-16	POS IONS CUP-7 LEV-14	*	3-10	16/744	111	0-15	00
SWS	DW-3	A/D CONVERTER CAL	*	3-10	16/744	112	EVN	01
SWS	DW-11	TEMP SENSOR MOD 100	*	3-10	8/744	112	ODD	01
SWS	DW-4	A/D CONVERTER CAL	*	3-10	8/744	113	EVN	01
SWS	DW-12	TEMP SENSOR MOD 200	*	3-10	8/744	113	ODD	01
SWS	DW-5	A/D CONVERTER CAL	*	3-10	16/744	114	EVN	01
SWS	DW-13	TEMP SENSOR MOD 300	*	3-10	8/744	114	ODD	01
SWS	DW-6	A/D CONVERTER CAL	*	3-10	8/744	115	EVN	01
SWS	DW-14	TEMP SENSOR CUP ASSM	*	3-10	8/744	115	ODD	01
SWS	DW-7	A/D CONVERTER CAL	*	3-10	16/744	116	EVN	01
SWS	DW-15	SUN ANGLE SENSOR	*	3-10	8/744	116	ODD	01
SWS	DW-3	A/D CONVERTER CAL	*	3-10	16/744	117	EVN	01
SWS	DW-16	PROGRAMMER VOLTAGE	*	3-10	8/744	117	ODD	01
SWS	DW-5	A/D CONVERTER CAL	*	3-10	16/744	118	EVN	01
SWS	DW-17	STEP GEN VOLTAGE	*	3-10	8/744	118	ODD	01
SWS	DW-7	A/D CONVERTER CAL	*	3-10	16/744	119	EVN	01
SWS	DW-18	MODULATION MONITOR	*	3-10	8/744	119	ODD	01
SWS	DW-19	CURRENT CAL	*	3-10	4/744	120	0	01
SWS	DW-27	CURRENT CAL	*	3-10	4/744	120	1	01
SWS	DW-35	CURRENT CAL	*	3-10	4/744	120	2	01
SWS	DW-43	CURRENT CAL	*	3-10	4/744	120	3	01
SWS	DW-19	CURRENT CAL	*	3-10	4/744	120	4	01
SWS	DW-27	CURRENT CAL	*	3-10	4/744	120	5	01
SWS	DW-35	CURRENT CAL	*	3-10	4/744	120	6	01
SWS	DW-43	CURRENT CAL	*	3-10	4/744	120	7	01
SWS	DW-19	CURRENT CAL	*	3-10	4/744	120	8	01
SWS	DW-27	CURRENT CAL	*	3-10	4/744	120	9	01
SWS	DW-35	CURRENT CAL	*	3-10	4/744	120	10	01
SWS	DW-43	CURRENT CAL	*	3-10	4/744	120	11	01
SWS	DW-19	CURRENT CAL	*	3-10	4/744	120	12	01
SWS	DW-27	CURRENT CAL	*	3-10	4/744	120	13	01
SWS	DW-35	CURRENT CAL	*	3-10	4/744	120	14	01

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD	FRM	BITS	S/MF	SWS WD	SWS SEQ	FG BT
SWS	DW-43	CURRENT CAL	*	*	3-10	4/744	120	15	01
SWS	DW-20	CURRENT CAL	*	*	3-10	4/744	121	0	01
SWS	DW-28	CURRENT CAL	*	*	3-10	4/744	121	1	01
SWS	DW-36	CURRENT CAL	*	*	3-10	4/744	121	2	01
SWS	DW-44	CURRENT CAL	*	*	3-10	4/744	121	3	01
SWS	DW-20	CURRENT CAL	*	*	3-10	4/744	121	4	01
SWS	DW-28	CURRENT CAL	*	*	3-10	4/744	121	5	01
SWS	DW-36	CURRENT CAL	*	*	3-10	4/744	121	6	01
SWS	DW-44	CURRENT CAL	*	*	3-10	4/744	121	7	01
SWS	DW-20	CURRENT CAL	*	*	3-10	4/744	121	8	01
SWS	DW-28	CURRENT CAL	*	*	3-10	4/744	121	9	01
SWS	DW-36	CURRENT CAL	*	*	3-10	4/744	121	10	01
SWS	DW-44	CURRENT CAL	*	*	3-10	4/744	121	11	01
SWS	DW-20	CURRENT CAL	*	*	3-10	4/744	121	12	01
SWS	DW-28	CURRENT CAL	*	*	3-10	4/744	121	13	01
SWS	DW-36	CURRENT CAL	*	*	3-10	4/744	121	14	01
SWS	DW-44	CURRENT CAL	*	*	3-10	4/744	121	15	01
SWS	DW-21	CURRENT CAL	*	*	3-10	4/744	122	0	01
SWS	DW-29	CURRENT CAL	*	*	3-10	4/744	122	1	01
SWS	DW-37	CURRENT CAL	*	*	3-10	4/744	122	2	01
SWS	DW-45	CURRENT CAL	*	*	3-10	4/744	122	3	01
SWS	DW-21	CURRENT CAL	*	*	3-10	4/744	122	4	01
SWS	DW-29	CURRENT CAL	*	*	3-10	4/744	122	5	01
SWS	DW-37	CURRENT CAL	*	*	3-10	4/744	122	6	01
SWS	DW-45	CURRENT CAL	*	*	3-10	4/744	122	7	01
SWS	DW-21	CURRENT CAL	*	*	3-10	4/744	122	8	01
SWS	DW-29	CURRENT CAL	*	*	3-10	4/744	122	9	01
SWS	DW-37	CURRENT CAL	*	*	3-10	4/744	122	10	01
SWS	DW-45	CURRENT CAL	*	*	3-10	4/744	122	11	01
SWS	DW-21	CURRENT CAL	*	*	3-10	4/744	122	12	01
SWS	DW-29	CURRENT CAL	*	*	3-10	4/744	122	13	01
SWS	DW-37	CURRENT CAL	*	*	3-10	4/744	122	14	01
SWS	DW-45	CURRENT CAL	*	*	3-10	4/744	122	15	01
SWS	DW-22	CURRENT CAL	*	*	3-10	4/744	123	0	01
SWS	DW-30	CURRENT CAL	*	*	3-10	4/744	123	1	01

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD FRM BITS	S/MF	SWS WD	SWS SEQ	FG BT
SWS	DW-38	CURRENT CAL	* * 3-10	4/744	123	2	01
SWS	DW-46	CURRENT CAL	* * 3-10	4/744	123	3	01
SWS	DW-22	CURRENT CAL	* * 3-10	4/744	123	4	01
SWS	DW-30	CURRENT CAL	* * 3-10	4/744	123	5	01
SWS	DW-38	CURRENT CAL	* * 3-10	4/744	123	6	01
SWS	DW-46	CURRENT CAL	* * 3-10	4/744	123	7	01
SWS	DW-22	CURRENT CAL	* * 3-10	4/744	123	8	01
SWS	DW-30	CURRENT CAL	* * 3-10	4/744	123	9	01
SWS	DW-38	CURRENT CAL	* * 3-10	4/744	123	10	01
SWS	DW-46	CURRENT CAL	* * 3-10	4/744	123	11	01
SWS	DW-22	CURRENT CAL	* * 3-10	4/744	123	12	01
SWS	DW-30	CURRENT CAL	* * 3-10	4/744	123	13	01
SWS	DW-38	CURRENT CAL	* * 3-10	4/744	123	14	01
SWS	DW-46	CURRENT CAL	* * 3-10	4/744	123	15	01
SWS	DW-23	CURRENT CAL	* * 3-10	4/744	124	0	01
SWS	DW-31	CURRENT CAL	* * 3-10	4/744	124	1	01
SWS	DW-39	CURRENT CAL	* * 3-10	4/744	124	2	01
SWS	DW-47	CURRENT CAL	* * 3-10	4/744	124	3	01
SWS	DW-23	CURRENT CAL	* * 3-10	4/744	124	4	01
SWS	DW-31	CURRENT CAL	* * 3-10	4/744	124	5	01
SWS	DW-39	CURRENT CAL	* * 3-10	4/744	124	6	01
SWS	DW-47	CURRENT CAL	* * 3-10	4/744	124	7	01
SWS	DW-23	CURRENT CAL	* * 3-10	4/744	124	8	01
SWS	DW-31	CURRENT CAL	* * 3-10	4/744	124	9	01
SWS	DW-39	CURRENT CAL	* * 3-10	4/744	124	10	01
SWS	DW-47	CURRENT CAL	* * 3-10	4/744	124	11	01
SWS	DW-23	CURRENT CAL	* * 3-10	4/744	124	12	01
SWS	DW-31	CURRENT CAL	* * 3-10	4/744	124	13	01
SWS	DW-39	CURRENT CAL	* * 3-10	4/744	124	14	01
SWS	DW-47	CURRENT CAL	* * 3-10	4/744	124	15	01
SWS	DW-24	CURRENT CAL	* * 3-10	4/744	125	0	01
SWS	DW-32	CURRENT CAL	* * 3-10	4/744	125	1	01
SWS	DW-40	CURRENT CAL	* * 3-10	4/744	125	2	01
SWS	DW-48	CURRENT CAL	* * 3-10	4/744	125	3	01
SWS	DW-24	CURRENT CAL	* * 3-10	4/744	125	4	01

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD	FRM	BITS	S/MF	SWS WD	SWS SEQ	FG BT
SWS	DW-32	CURRENT CAL	*	*	3-10	4/744	125	5	01
SWS	DW-40	CURRENT CAL	*	*	3-10	4/744	125	6	01
SWS	DW-48	CURRENT CAL	*	*	3-10	4/744	125	7	01
SWS	DW-24	CURRENT CAL	*	*	3-10	4/744	125	8	01
SWS	DW-32	CURRENT CAL	*	*	3-10	4/744	125	9	01
SWS	DW-40	CURRENT CAL	*	*	3-10	4/744	125	10	01
SWS	DW-48	CURRENT CAL	*	*	3-10	4/744	125	11	01
SWS	DW-24	CURRENT CAL	*	*	3-10	4/744	125	12	01
SWS	DW-32	CURRENT CAL	*	*	3-10	4/744	125	13	01
SWS	DW-40	CURRENT CAL	*	*	3-10	4/744	125	14	01
SWS	DW-48	CURRENT CAL	*	*	3-10	4/744	125	15	01
SWS	DW-25	CURRENT CAL	*	*	3-10	4/744	126	0	01
SWS	DW-33	CURRENT CAL	*	*	3-10	4/744	126	1	01
SWS	DW-41	CURRENT CAL	*	*	3-10	4/744	126	2	01
SWS	DW-49	CURRENT CAL	*	*	3-10	4/744	126	3	01
SWS	DW-25	CURRENT CAL	*	*	3-10	4/744	126	4	01
SWS	DW-33	CURRENT CAL	*	*	3-10	4/744	126	5	01
SWS	DW-41	CURRENT CAL	*	*	3-10	4/744	126	6	01
SWS	DW-49	CURRENT CAL	*	*	3-10	4/744	126	7	01
SWS	DW-25	CURRENT CAL	*	*	3-10	4/744	126	8	01
SWS	DW-33	CURRENT CAL	*	*	3-10	4/744	126	9	01
SWS	DW-41	CURRENT CAL	*	*	3-10	4/744	126	10	01
SWS	DW-49	CURRENT CAL	*	*	3-10	4/744	126	11	01
SWS	DW-25	CURRENT CAL	*	*	3-10	4/744	126	12	01
SWS	DW-33	CURRENT CAL	*	*	3-10	4/744	126	13	01
SWS	DW-41	CURRENT CAL	*	*	3-10	4/744	126	14	01
SWS	DW-49	CURRENT CAL	*	*	3-10	4/744	126	15	01
SWS	DW-26	CURRENT CAL	*	*	3-10	4/744	127	0	01
SWS	DW-34	CURRENT CAL	*	*	3-10	4/744	127	1	01
SWS	DW-42	CURRENT CAL	*	*	3-10	4/744	127	2	01
SWS	DW-50	CURRENT CAL	*	*	3-10	4/744	127	3	01
SWS	DW-26	CURRENT CAL	*	*	3-10	4/744	127	4	01
SWS	DW-34	CURRENT CAL	*	*	3-10	4/744	127	5	01
SWS	DW-42	CURRENT CAL	*	*	3-10	4/744	127	6	01
SWS	DW-50	CURRENT CAL	*	*	3-10	4/744	127	7	01

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD	FRM	BITS	S/MF	SWS WD	SWS SEQ	FG BT
SWS	DW-26	CURRENT CAL	*	*	3-10	4/744	127	8	01
SWS	DW-34	CURRENT CAL	*	*	3-10	4/744	127	9	01
SWS	DW-42	CURRENT CAL	*	*	3-10	4/744	127	10	01
SWS	DW-50	CURRENT CAL	*	*	3-10	4/744	127	11	01
SWS	DW-26	CURRENT CAL	*	*	3-10	4/744	127	12	01
SWS	DW-34	CURRENT CAL	*	*	3-10	4/744	127	13	01
SWS	DW-42	CURRENT CAL	*	*	3-10	4/744	127	14	01
SWS	DW-50	CURRENT CAL	*	*	3-10	4/744	127	15	01
SWS	DZ-17	ELEC-SUM-LEV-15	*	*	3-10	14/744	128	0-13	00
SWS	DW-65	DC HV CAL LEV-1 ELEC	*	*	3-10	1/744	128	14	01
SWS	DW-86	AC HV CAL LEV-1 ELEC	*	*	3-10	1/744	128	15	01
SWS	DZ-18	ELEC-CUP-1-LEV-15	*	*	3-10	16/744	129	0-15	00
SWS	DZ-19	ELEC-CUP-2-LEV-15	*	*	3-10	16/744	130	0-15	00
SWS	DZ-20	ELEC-CUP-3-LEV-15	*	*	3-10	16/744	131	0-15	00
SWS	DZ-21	ELEC-CUP-4-LEV-15	*	*	3-10	16/744	132	0-15	00
SWS	DZ-22	ELEC-CUP-5-LEV-15	*	*	3-10	16/744	133	0-15	00
SWS	DZ-23	ELEC-CUP-6-LEV-15	*	*	3-10	16/744	134	0-15	00
SWS	DZ-24	ELEC-CUP-7-LEV-15	*	*	3-10	16/744	135	0-15	00
SWS	DZ-25	ELEC-SUM-LEV-16	*	*	3-10	14/744	136	0-13	00
SWS	DW-66	DC HV CAL LEV-2 ELEC	*	*	3-10	1/744	136	14	01
SWS	DW-87	AC HV CAL LEV-2 ELEC	*	*	3-10	1/744	136	15	01
SWS	DZ-26	ELEC-CUP-1-LEV-16	*	*	3-10	16/744	137	0-15	00
SWS	DZ-27	ELEC-CUP-2-LEV-16	*	*	3-10	16/744	138	0-15	00
SWS	DZ-28	ELEC-CUP-3-LEV-16	*	*	3-10	16/744	139	0-15	00
SWS	DZ-29	ELEC-CUP-4-LEV-16	*	*	3-10	16/744	140	0-15	00
SWS	DZ-30	ELEC-CUP-5-LEV-16	*	*	3-10	16/744	141	0-15	00
SWS	DZ-31	ELEC-CUP-6-LEV-16	*	*	3-10	16/744	142	0-15	00
SWS	DZ-32	ELEC-CUP-7-LEV-16	*	*	3-10	16/744	143	0-15	00
SWS	DZ-33	ELEC-SUM-LEV-17	*	*	3-10	14/744	144	0-13	00
SWS	DW-67	DC HV CAL LEV-3 ELEC	*	*	3-10	1/744	144	14	01
SWS	DW-88	AC HV CAL LEV-3 ELEC	*	*	3-10	1/744	144	15	01
SWS	DZ-34	ELEC-CUP-1-LEV-17	*	*	3-10	16/744	145	0-15	00
SWS	DZ-35	ELEC-CUP-2-LEV-17	*	*	3-10	16/744	146	0-15	00
SWS	DZ-36	ELEC-CUP-3-LEV-17	*	*	3-10	16/744	147	0-15	00
SWS	DZ-37	ELEC-CUP-4-LEV-17	*	*	3-10	16/744	148	0-15	00

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD	FRM	BITS	S/MF	SWS WD	SWS SEQ	FG BT
SWS	DZ-38	ELEC-CUP-5-LEV-17	*	*	3-10	16/744	149	0-15	00
SWS	DZ-39	ELEC-CUP-6-LEV-17	*	*	3-10	16/744	150	0-15	00
SWS	DZ-40	ELEC-CUP-7-LEV-17	*	*	3-10	16/744	151	0-15	00
SWS	DZ-41	ELEC-SUM-LEV-18	*	*	3-10	14/744	152	0-13	00
SWS	DW-68	DC HV CAL LEV-4 ELEC	*	*	3-10	1/744	152	14	01
SWS	DW-89	AC HV CAL LEV-4 ELEC	*	*	3-10	1/744	152	15	01
SWS	DZ-42	ELEC-CUP-1 LEV-18	*	*	3-10	16/744	153	0-15	00
SWS	DZ-43	ELEC-CUP-2 LEV-18	*	*	3-10	16/744	154	0-15	00
SWS	DZ-44	ELEC-CUP-3 LEV-18	*	*	3-10	16/744	155	0-15	00
SWS	DZ-45	ELEC-CUP-4 LEV-18	*	*	3-10	16/744	156	0-15	00
SWS	DZ-46	ELEC-CUP-5 LEV-18	*	*	3-10	16/744	157	0-15	00
SWS	DZ-47	ELEC-CUP-6 LEV-18	*	*	3-10	16/744	158	0-15	00
SWS	DZ-48	ELEC-CUP-7 LEV-18	*	*	3-10	16/744	159	0-15	00
SWS	DZ-49	ELEC-SUM-LEV-19	*	*	3-10	14/744	160	0-13	00
SWS	DW-69	DC HV CAL LEV-5 ELEC	*	*	3-10	1/744	160	14	01
SWS	DW-90	AC HV CAL LEV-5 ELEC	*	*	3-10	1/744	160	15	01
SWS	DZ-50	ELEC-CUP-1-LEV-19	*	*	3-10	16/744	161	0-15	00
SWS	DZ-51	ELEC-CUP-2-LEV-19	*	*	3-10	16/744	162	0-15	00
SWS	DZ-52	ELEC-CUP-3-LEV-19	*	*	3-10	16/744	163	0-15	00
SWS	DZ-53	ELEC-CUP-4-LEV-19	*	*	3-10	16/744	164	0-15	00
SWS	DZ-54	ELEC-CUP-5-LEV-19	*	*	3-10	16/744	165	0-15	00
SWS	DZ-55	ELEC-CUP-6-LEV-19	*	*	3-10	16/744	166	0-15	00
SWS	DZ-56	ELEC-CUP-7-LEV-19	*	*	3-10	16/744	167	0-15	00
SWS	DZ-57	ELEC-SUM-LEV-20	*	*	3-10	14/744	168	0-13	00
SWS	DW-70	DC HV CAL LEV-6 ELEC	*	*	3-10	1/744	168	14	01
SWS	DW-91	AC HV CAL LEV-6 ELEC	*	*	3-10	1/744	168	15	01
SWS	DZ-58	ELEC-CUP-1-LEV-20	*	*	3-10	16/744	169	0-15	00
SWS	DZ-59	ELEC-CUP-2-LEV-20	*	*	3-10	16/744	170	0-15	00
SWS	DZ-60	ELEC-CUP-3-LEV-20	*	*	3-10	16/744	171	0-15	00
SWS	DZ-61	ELEC-CUP-4-LEV-20	*	*	3-10	16/744	172	0-15	00
SWS	DZ-62	ELEC-CUP-5-LEV-20	*	*	3-10	16/744	173	0-15	00
SWS	DZ-63	ELEC-CUP-6-LEV-20	*	*	3-10	16/744	174	0-15	00
SWS	DZ-64	ELEC-CUP-7-LEV-20	*	*	3-10	16/744	175	0-15	00
SWS	DZ-65	ELEC-SUM-LEV-21	*	*	3-10	14/744	176	0-13	00
SWS	DW-71	DC HV CAL LEV-7 ELEC	*	*	3-10	1/744	176	14	01
SWS	DW-92	AC HV CAL LEV-7 ELEC	*	*	3-10	1/744	176	15	01
SWS	DZ-66	ELEC-CUP-1-LEV-21	*	*	3-10	16/744	177	0-15	00
SWS	DZ-67	ELEC-CUP-2-LEV-21	*	*	3-10	16/744	178	0-15	00
SWS	DZ-68	ELEC-CUP-3-LEV-21	*	*	3-10	16/744	179	0-15	00
SWS	DZ-69	ELEC-CUP-4-LEV-21	*	*	3-10	16/744	180	0-15	00
SWS	DZ-70	ELEC-CUP-5-LEV-21	*	*	3-10	16/744	181	0-15	00
SWS	DZ-71	ELEC-CUP-6-LEV-21	*	*	3-10	16/744	182	0-15	00
SWS	DZ-72	ELEC-CUP-7-LEV-21	*	*	3-10	16/744	183	0-15	00
SWS	DW-1	SEQ CTR 1-BIT/SEQ	*	*	3-10	16/744	184	0-15	10
SWS	DW-2	SEQ CTR 1-BIT/256SEQ	*	*	3-10	16/744	185	0-15	10

1.2.1.6 Suprathermal Ion Detector and Cold Cathode Gage Experiment (SIDE)

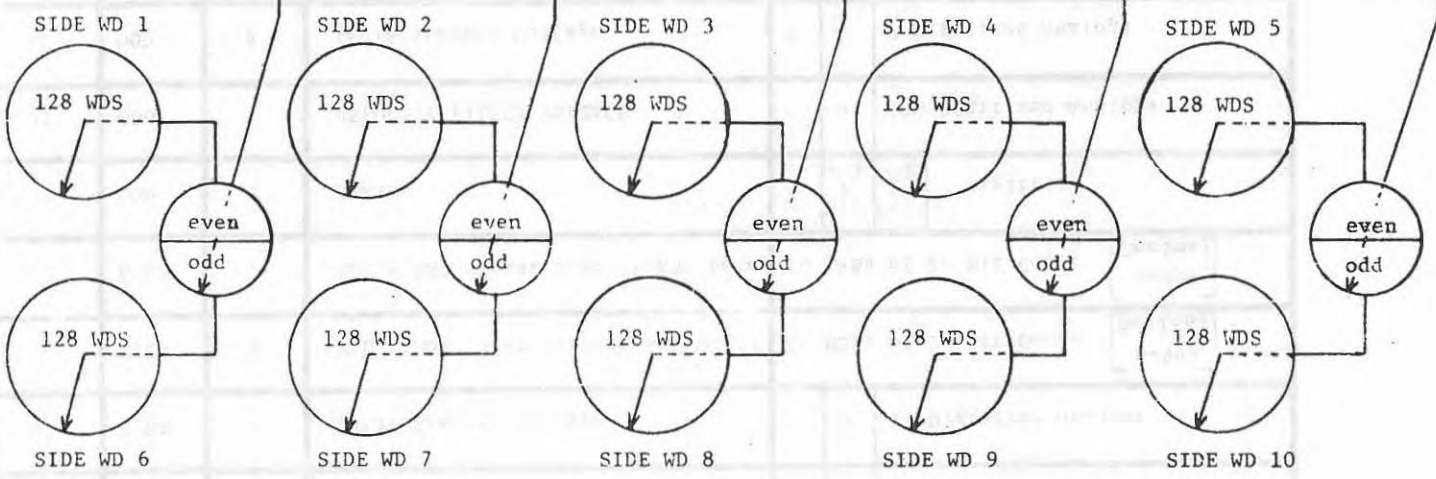
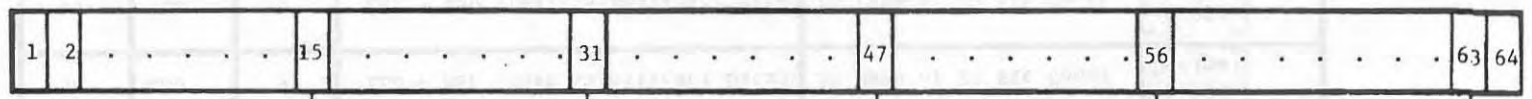
1.2.1.6.1 SIDE Downlink Description

SIDE uses 5 ALSEP main frame words: 15, 31, 47, 56 and 63. Each of the 5 ALSEP words is a two-channel subcommutator, each with a 128-channel sub-subcommutator. The output of the 5 two-channel subcommutator is designated by a SIDE word number of 1 thru 10. These 10 SIDE words constitute a SIDE frame. The SIDE word number that is read out in a particular ALSEP frame is determined by the contents of the LSB of the 90-channel frame counter in ALSEP Word 3. If the LSB is "0", which is EVEN, ALSEP Words 15, 31, 47, 56 and 63 read out SIDE Words 1 thru 5, respectively. If the LSB is "1", which is ODD, ALSEP Words 15, 31, 47, 56 and 63 read out SIDE Words 6 thru 10, respectively. SIDE words 1 and 6 contain bits which also define the ALSEP frame as being EVEN or ODD.

10 SIDE WORDS	=	1 SIDE FRAME	=	2 ALSEP MAIN FRAMES
128 SIDE FRAMES	=	1 SIDE CYCLE	=	256 ALSEP MAIN FRAMES
24 SIDE CYCLES	=	1 SIDE FIELD	=	6144 ALSEP MAIN FRAMES

ALSEP MAIN FRAME

ALSEP WORD



SIDE SUBCOMMUTATION

C-37

1.2-36

SIDE WORD DEFINITIONS

ALSEP		SIDE WORD	CONTENT	MSB										LSB
WORD	FRAME			1	2	3	4	5	6	7	8	9	10	
15	EVEN	1	SIDE FRAME COUNTER	P	$F_1/0$	$F_2/0$	0-127 Frame Count							
31	EVEN	2	HOUSEKEEPING	0	0	30 Digitized Analogs								
47	EVEN	3	HECPA Stepper Voltage	0	0	21 Digitized Analogs								
56	EVEN	4	HED - MSD (Most Significant Data)	10 MSBs of 20 Bit Count						0-999 Decimal				
63	EVEN	5	HED - LSD (Least Significant Data)	10 LSBs of 20 Bit Count						0-999 Decimal				
15	ODD	6	STATUS	P	$F_1/1$	$F_2/1$	9 Digitals							
31	ODD	7	VELOCITY FILTER VOLTAGE	0	0	126 Digitized Analogs								
47	ODD	8	LECPA Stepper Voltage	0	0	7 Digitized Analogs								
56	ODD	9	LED - MSD (Most Significant Data)	10 MSBs of 20 Bit Count						0-999 Decimal				
63	ODD	10	LED - LSD (Least Significant Data)	10 LSBs of 20 Bit Count						0-999 Decimal				



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P = Parity "1" - Odd number of ones in previous ALSEP frame.
 "0" - Even number of ones in previous ALSEP frame.
 $F_1 F_2$ = ALSEP FRM ID: 00-EVEN, 11-ODD

* BIT WTs. not applicable when defined.

SIDE COMMANDS

The SIDE has the ability to change its data format by command. There are fifteen operational commands. They are divided into two types, on/off commands and mode commands. Initiation of a mode command changes the operational data format characteristics. Executing any mode or on/off command will eliminate the existing operational mode, whereas execution of mode commands will not affect the status of any on/off commanded functions. The 15 commands are listed on the chart on the following page.

The Command Register, supercommutated in 24 of the SIDE frames in SIDE Word 6, reads out the command awaiting execution by the SIDE. The output configuration is shown on chart. Upon execution of a particular command the register will read out zeros.

The Mode Register is supercommutated in 26 of the SIDE frames in SIDE Word 6. It reads out which of the 14 commands is being performed by the SIDE as shown in the chart. The command that doesn't read out in the Mode Register is Reset Command Register which clears the Command Register.

There are two one time Commands, BREAK CCIG SEAL and BLOW DUST COVER. The status of these is supercommutated in 4 side frames of SIDE Word 6, Dust Cover and Seal. When these commands have been executed zeroes will be read out from then on. A one in this measurement indicates that only the Break Seal command has been executed; a two indicates that only the Blow Dust Cover command has been executed; and a 3 indicates that the one time commands have not been executed.

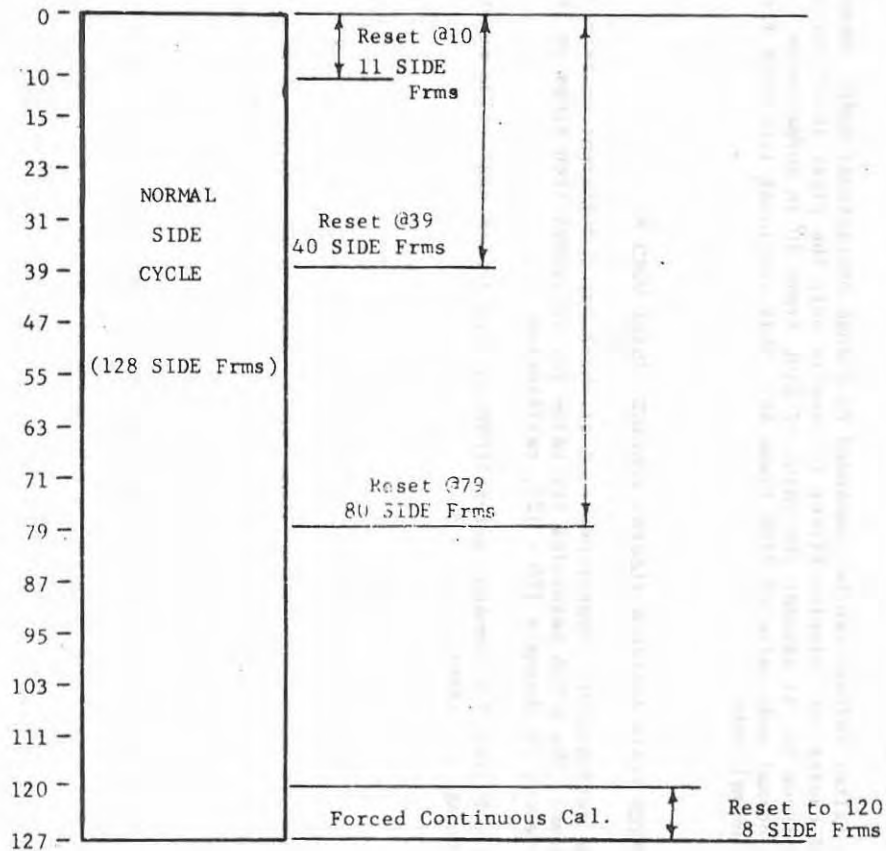
COMMAND OR MODE REGISTER CONTENT - SIDE WORD 6

SIDE CMD No.	COMMAND FUNCTIONS	LSB	9	8	7	6	5	MSB
		2 ⁰	2 ¹	2 ²	2 ³	2 ⁴	2 ⁵	2 ⁶
1.	Gnd plane step programmer on/off	1	0	0	0	0	0	0
2. *	Reset SIDE frame counter @ 10	0	1	0	0	0	0	0
3. *	Reset SIDE frame counter @ 39	1	1	0	0	0	0	0
4. *	Reset velocity filter @ 9	0	0	1	0	0	0	0
5. *	Reset SIDE frame counter @ 79	1	0	1	0	0	0	0
6. *	Reset SIDE frm ct @ 79 & vel filt @ 9	0	1	1	0	0	0	0
7.	X 10 accumulation interval on/off	1	1	1	0	0	0	0
8. *	Master reset	0	0	0	1	0	0	0
9.	Velocity filter voltage on/off	1	0	0	1	0	0	0
10.	LECPA high voltage on/off	0	1	0	1	0	0	0
11.	HECPA high voltage on/off	1	1	0	1	0	0	0
12. *	Force cont. cal. (Reset to 120)	0	0	1	1	0	0	0
13.	CCIG high voltage on/off	1	0	1	1	0	0	0
14.	Channeltron high voltage on/off	0	1	1	1	0	0	0
15.	Reset command register	1	1	1	1	0	0	0

* - MODE Commands

SIDE WORDS AFFECTED BY SIDE COMMANDS

A. SIDE FRAME COUNTER (SIDE Word 1)



NORMAL MODE

When the SIDE Experiment power is turned on, the SIDE frame counter resets to 0. It then counts through 127 before resetting to 0, resulting in 128 SIDE frames/SIDE cycle. The frame counter increments by one on the receipt of an even frame pulse.

RESET MODE

Upon command the SIDE frame counter may be operated in reset modes to vary the length of a SIDE cycle.

The SIDE frame counter may be operated in modes: Reset @10, Reset @39, or Reset @79. The command to reset SIDE frame counter @10 causes the frame counter to reset to 0 and then count thru 10 rather than the normal 127 before resetting to 0 again. The SIDE cycle during operation in this mode is 11 frames rather than the normal 128. The SIDE frame counter operates in this mode until a command changes the operational mode. Reset @39 and @79 commands cause the frame counter to operate in a similar manner as reset @10, except counter resets to 0 at frames 39 or 79.

Force Continuous Calibration (Reset to 120) command causes the frame counter to reset to 120. It then counts thru 127 and again resets to 120. It continues counting 120-127 giving continuous calibration data until a command changes the mode.

A. (CONTINUED)

The Master Reset Command will reset the SIDE frame counter to 0 and return the experiment to its normal operational mode.

The execution of an on/off command will reset the SIDE frame counter to 0 and return SIDE to its normal operational mode.

Another command which affects the SIDE frame counter is X10 Accumulation Interval On/Off Command. This command causes each SIDE frame and SIDE frame count to be output 10 times before advancing to the next frame and frame count. The length of the cycle can be varied by mode commands.

B. VELOCITY FILTER VOLTAGE (SIDE WORD 7)

Velocity Filter Voltage consists of 120 different Voltage steps, 20 steps for each of the 6 voltages of the LECPA. Channels 120 - 127 are calibrations. In the normal mode, 126 measurements are readout.

The Velocity Filter Voltage can be commanded to change operational mode. Reset Velocity Filter @ 9 command causes the Velocity Filter to execute only the first 10 of its normal 20 step program. At SIDE frame 10 it assumes the value of SIDE frame 20 in normal mode. At SIDE frame 20 it assumes the normal mode value of SIDE frame 40. This continues like this for the complete 128 frames during normal mode.

C. LOW ENERGY CURVED PLATE ANALYZER (LECPA) VOLTAGE (SIDE WORD 8)

LECPA Voltage consists of 7 measurements, 6 of which are 6 different voltage levels output on a 20 step program. The LECPA maintains its value for 20 frames then steps to the next value. The Seventh measurement is channels 120 - 127, calibration.

Reset Velocity Filter @ 9 command causes LECPA to step to the next value every 10 frames, rather than the normal 20 frames.

1.2.1.6.2 SIDE PARAMETER LISTING

DOWNLINK LISTINGS COLUMN HEADERS

- Col. 1 Experiment name.
- Col. 2 Measurement number. (An asterisk in col. 11 indicates that the word is subcommand)
- Col. 3 Measurement name.
- Col. 4 ALSEP main frame (1-64) word. An asterisk in this column indicates that experiment's words are asynchronous with respect to the ALSEP main frame word.
- Col. 5 ALSEP frame. The ALSEP frame number as read from the ALSEP frame counter in ALSEP word 3. The ALSEP frame counter counts from 1-89, and then to 0, which represents 90. Columns 46-48 may contain one of the following words:
- ALL = All ALSEP main frames
 - EVN = Even numbered ALSEP main frames
 - ODD = Odd numbered ALSEP main frames.
- An asterisk in this column indicates that this parameter is asynchronous with respect to the ALSEP frame.
- Col. 6 Bits. Indicates which of the ten bits (1-10) of an ALSEP or experiment word contain the measurement number given in columns 7-11.
- Col. 7 Samples per Main Frame (S/MF). Indicates how often (on the average) a parameter appears in the ALSEP main frame.
- Col. 8 Experiment word. For the LSM these columns indicate the LSM word number (1-16)
For the SIDE these columns indicate the SIDE word number (1-10)
For the SWS these columns indicate the SWS word number (0-185)
- Col. 9 Experiment Frame. For the SWS these columns indicate the SWS sequence number (0-15)
For the SIDE these columns indicate the SIDE frame number (0-127)
- Col. 10 Flag bits.

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD	FRM	BITS	S/MF	SIDE WD	SIDE FRAME	FG BT
SIDE	DF-7	PARITY	15	EVN	1	128/256	1	0-127	
SIDE	DF-8	FRAME ID (00)	15	EVN	2-3	128/256	1	0-127	
SIDE	DI-1	SIDE FRM CTR (0-127)	15	EVN	4-10	128/256	1	0-127	
SIDE		FILL ZEROS	31	EVN	1-2	128/256	2	0-127	
SIDE	DI-2	+5 VOLTS ANALOG	31	EVN	3-10	4/256	2	0	
SIDE	DI-3	CCGE OUTPUT	31	EVN	3-10	15/256	2	1	
SIDE	DI-4	TEMP-1	31	EVN	3-10	4/256	2	2	
SIDE	DI-3	CCGE OUTPUT	31	EVN	3-10	15/256	2	3	
SIDE	DI-5	TEMP-2	31	EVN	3-10	4/256	2	4	
SIDE	DI-3	CCGE OUTPUT	31	EVN	3-10	15/256	2	5	
SIDE	DI-6	TEMP-3	31	EVN	3-10	4/256	2	6	
SIDE	DI-3	CCGE OUTPUT	31	EVN	3-10	15/256	2	7	
SIDE	DI-7	4.5 KV	31	EVN	3-10	4/256	2	8	
SIDE	DI-3	CCGE OUTPUT	31	EVN	3-10	15/256	2	9	
SIDE	DI-8	CCGE RANGE	31	EVN	3-10	8/256	2	10	
SIDE	DI-9	TEMP-4	31	EVN	3-10	4/256	2	11	
SIDE	DI-10	TEMP-5	31	EVN	3-10	4/256	2	12	
SIDE	DI-11	GND PLANE VOLTAGE	31	EVN	3-10	15/256	2	13	
SIDE	DI-12	SOLAR CELL	31	EVN	3-10	2/256	2	14	
SIDE	DI-11	GND PLANE VOLTAGE	31	EVN	3-10	15/256	2	15	
SIDE	DI-13	+60 VOLTS	31	EVN	3-10	4/256	2	16	
SIDE	DI-14	+30 VOLTS	31	EVN	3-10	4/256	2	17	
SIDE	DI-15	+5 VOLTS DIGITAL	31	EVN	3-10	4/256	2	18	
SIDE	DI-16	GROUND	31	EVN	3-10	4/256	2	19	
SIDE	DI-17	-5 VOLTS	31	EVN	3-10	4/256	2	20	
SIDE	DI-18	-30 VOLTS	31	EVN	3-10	4/256	2	21	
SIDE	DI-19	TEMP-6	31	EVN	3-10	4/256	2	22	
SIDE	DI-20	-3.5 KV	31	EVN	3-10	4/256	2	23	
SIDE	DI-8	CCGE RANGE	31	EVN	3-10	8/256	2	24	
SIDE	DI-22	+30 MULTIVOLT CAL	31	EVN	3-10	3/256	2	25	
SIDE	DI-23	+A/D REF VOLTAGE	31	EVN	3-10	3/256	2	26	
SIDE	DI-21	+1.0 VOLT CAL	31	EVN	3-10	3/256	2	27	
SIDE	DI-28	+12 VOLT CAL	31	EVN	3-10	3/256	2	28	
SIDE	DI-11	GND PLANE VOLTAGE	31	EVN	3-10	15/256	2	29	
SIDE	DI-25	-A/D REF VOLT	31	EVN	3-10	3/256	2	30	

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD FRM	BITS	S/MF	SIDE WD	SIDE FRAME	FG BT
SIDE	D1-11	GND PLANE VOLTAGE	31 EVN	3-10	15/256	2	31	
SIDE	D1-2	+5 VOLTS ANALOG	31 EVN	3-10	4/256	2	32	
SIDE	DF-29	1-TIME CMD REG STAT	31 EVN	3-10	4/256	2	33	
SIDE	D1-4	TEMP-1	31 EVN	3-10	4/256	2	34	
SIDE	DF-29	1-TIME CMD REG STAT	31 EVN	3-10	4/256	2	35	
SIDE	D1-5	TEMP-2	31 EVN	3-10	4/256	2	36	
SIDE	D1-26	-1.0 VOLT CAL	31 EVN	3-10	2/256	2	37	
SIDE	D1-6	TEMP-3	31 EVN	3-10	4/256	2	38	
SIDE	D1-27	-12 VOLT CAL	31 EVN	3-10	2/256	2	39	
SIDE	D1-7	4.5 KV	31 EVN	3-10	4/256	2	40	
SIDE	D1-3	CCGE OUTPUT	31 EVN	3-10	15/256	2	41	
SIDE	D1-8	CCGE RANGE	31 EVN	3-10	8/256	2	42	
SIDE	D1-9	TEMP-4	31 EVN	3-10	4/256	2	43	
SIDE	D1-10	TEMP-5	31 EVN	3-10	4/256	2	44	
SIDE	D1-11	GND PLANE VOLTAGE	31 EVN	3-10	15/256	2	45	
SIDE	D1-30	-30 MULTIVOLT CAL	31 EVN	3-10	2/256	2	46	
SIDE	D1-11	GND PLANE VOLTAGE	31 EVN	3-10	15/256	2	47	
SIDE	D1-13	+60 VOLTS	31 EVN	3-10	4/256	2	48	
SIDE	D1-14	+30 VOLTS	31 EVN	3-10	4/256	2	49	
SIDE	D1-15	+5 VOLTS DIGITAL	31 EVN	3-10	4/256	2	50	
SIDE	D1-16	GROUND	31 EVN	3-10	4/256	2	51	
SIDE	D1-17	-5 VOLTS	31 EVN	3-10	4/256	2	52	
SIDE	D1-18	-30 VOLTS	31 EVN	3-10	4/256	2	53	
SIDE	D1-19	TEMP-6	31 EVN	3-10	4/256	2	54	
SIDE	D1-20	-3.5 KV	31 EVN	3-10	4/256	2	55	
SIDE	D1-8	CCGE RANGE	31 EVN	3-10	8/256	2	56	
SIDE	D1-22	+30 MULTIVOLT CAL	31 EVN	3-10	3/256	2	57	
SIDE	D1-23	+A/D REF VOLTAGE	31 EVN	3-10	3/256	2	58	
SIDE	D1-21	+1.0 VOLT CAL	31 EVN	3-10	3/256	2	59	
SIDE	D1-28	+12 VOLT CAL	31 EVN	3-10	3/256	2	60	
SIDE	D1-11	GND PLANE VOLTAGE	31 EVN	3-10	15/256	2	61	
SIDE	D1-25	-A/D REF VOLT	31 EVN	3-10	3/256	2	62	
SIDE	D1-11	GND PLANE VOLTAGE	31 EVN	3-10	15/256	2	63	
SIDE	D1-2	+5 VOLTS ANALOG	31 EVN	3-10	4/256	2	64	
SIDE	D1-29	PRF REG DUTY FACTOR	31 EVN	3-10	1/256	2	65	

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EXP NAME	MEAS NO	MEAS NAME	ALSEP WD FRM BITS	S/MF	SIDE WD	SIDE FRAME	FG BT
SIDE	DI-4	TEMP-1	31 EVN 3-10	4/256	2	66	
SIDE	DI-24	DUST COVER AND SEAL	31 EVN 3-10	2/256	2	67	
SIDE	DI-5	TEMP-2	31 EVN 3-10	4/256	2	68	
SIDE	DI-11	GND PLANE VOLTAGE	31 EVN 3-10	15/256	2	69	
SIDE	DI-6	TEMP-3	31 EVN 3-10	4/256	2	70	
SIDE	DI-24	DUST COVER AND SEAL	31 EVN 3-10	2/256	2	71	
SIDE	DI-7	4.5 KV	31 EVN 3-10	4/256	2	72	
SIDE	DI-3	CCGE OUTPUT	31 EVN 3-10	15/256	2	73	
SIDE	DI-8	CCGE RANGE	31 EVN 3-10	8/256	2	74	
SIDE	DI-9	TEMP-4	31 EVN 3-10	4/256	2	75	
SIDE	DI-10	TEMP-5	31 EVN 3-10	4/256	2	76	
SIDE	DI-11	GND PLANE VOLTAGE	31 EVN 3-10	8/256	2	77	
SIDE	DI-12	SOLAR CELL	31 EVN 3-10	2/256	2	78	
SIDE	DI-11	GND PLANE VOLTAGE	31 EVN 3-10	8/256	2	79	
SIDE	DI-13	+60 VOLTS	31 EVN 3-10	4/256	2	80	
SIDE	DI-14	+30 VOLTS	31 EVN 3-10	4/256	2	81	
SIDE	DI-15	+5 VOLTS DIGITAL	31 EVN 3-10	4/256	2	82	
SIDE	DI-16	GROUND	31 EVN 3-10	4/256	2	83	
SIDE	DI-17	-5 VOLTS	31 EVN 3-10	4/256	2	84	
SIDE	DI-18	-30 VOLTS	31 EVN 3-10	4/256	2	85	
SIDE	DI-19	TEMP-6	31 EVN 3-10	4/256	2	86	
SIDE	DI-20	-3.5 KV	31 EVN 3-10	4/256	2	87	
SIDE	DI-8	CCGE RANGE	31 EVN 3-10	8/256	2	88	
SIDE	DI-22	+30 MULTIVOLT CAL	31 EVN 3-10	3/256	2	89	
SIDE	DI-23	+A/D REF VOLTAGE	31 EVN 3-10	3/256	2	90	
SIDE	DI-21	+1.0 VOLT CAL	31 EVN 3-10	3/256	2	91	
SIDE	DI-28	+12 VOLT CAL	31 EVN 3-10	3/256	2	92	
SIDE	DI-11	GND PLANE VOLTAGE	31 EVN 3-10	8/256	2	93	
SIDE	DI-25	-A/D REF VOLT	31 EVN 3-10	3/256	2	94	
SIDE	DI-11	GND PLANE VOLTAGE	31 EVN 3-10	8/256	2	95	
SIDE	DI-2	+5 VOLTS ANALOG	31 EVN 3-10	4/256	2	96	
SIDE	DF-29	1-TIME CMD REG STAT	31 EVN 3-10	4/256	2	97	
SIDE	DI-4	TEMP-1	31 EVN 3-10	4/256	2	98	
SIDE	DF-29	1-TIME CMD REG STAT	31 EVN 3-10	4/256	2	99	
SIDE	DI-5	TEMP-2	31 EVN 3-10	4/256	2	100	

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD	FRM	RITS	S/MF	SIDE WD	SIDE FRAME	FG HT
SIDE	DI-26	-1.0 VOLT CAL	31	EVN	3-10	2/256	2	101	
SIDE	DI-6	TEMP-3	31	EVN	3-10	4/256	2	102	
SIDE	DI-27	-12 VOLT CAL	31	EVN	3-10	2/256	2	103	
SIDE	DI-7	4.5 KV	31	EVN	3-10	4/256	2	104	
SIDE	DI-3	CCGE OUTPUT	31	EVN	3-10	15/256	2	105	
SIDE	DI-8	CCGE RANGE	31	EVN	3-10	8/256	2	106	
SIDE	DI-9	TEMP-4	31	EVN	3-10	4/256	2	107	
SIDE	DI-10	TEMP-5	31	EVN	3-10	4/256	2	108	
SIDE	DI-11	GND PLANE VOLTAGE	31	EVN	3-10	8/256	2	109	
SIDE	DI-30	-30 MULTIVOLT CAL	31	EVN	3-10	2/256	2	110	
SIDE	DI-11	GND PLANE VOLTAGE	31	EVN	3-10	8/256	2	111	
SIDE	DI-13	+60 VOLTS	31	EVN	3-10	4/256	2	112	
SIDE	DI-14	+30 VOLTS	31	EVN	3-10	4/256	2	113	
SIDE	DI-15	+5 VOLTS DIGITAL	31	EVN	3-10	4/256	2	114	
SIDE	DI-16	GROUND	31	EVN	3-10	4/256	2	115	
SIDE	DI-17	-5 VOLTS	31	EVN	3-10	4/256	2	116	
SIDE	DI-18	-30 VOLTS	31	EVN	3-10	4/256	2	117	
SIDE	DI-19	TEMP-6	31	EVN	3-10	4/256	2	118	
SIDE	DI-20	-3.5 KV	31	EVN	3-10	4/256	2	119	
SIDE	DI-8	CCGE RANGE	31	EVN	3-10	8/256	2	120	
SIDE	DI-3	CCGE OUTPUT	31	EVN	3-10	15/256	2	121	
SIDE	DI-3	CCGE OUTPUT	31	EVN	3-10	15/256	2	122	
SIDE	DI-3	CCGE OUTPUT	31	EVN	3-10	15/256	2	123	
SIDE	DI-3	CCGE OUTPUT	31	EVN	3-10	15/256	2	124	
SIDE	DI-3	CCGE OUTPUT	31	EVN	3-10	15/256	2	125	
SIDE	DI-3	CCGE OUTPUT	31	EVN	3-10	15/256	2	126	
SIDE	DI-3	CCGE OUTPUT	31	EVN	3-10	15/256	2	127	
SIDE		FILL ZEROS	47	EVN	1-2	123/256	3	127	
SIDE	DI-60	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3	0	
SIDE	DI-40	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3	1	
SIDE	DI-41	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3	2	
SIDE	DI-42	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3	3	
SIDE	DI-43	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3	4	
SIDE	DI-44	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3	5	
SIDE	DI-45	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3	6	

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD	FRM	BITS	S/MF	SIDE WD	SIDE FRAME	FG BT
SIDE	DI-46	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		7
SIDE	DI-47	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		8
SIDE	DI-48	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		9
SIDE	DI-49	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		10
SIDE	DI-50	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		11
SIDE	DI-51	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		12
SIDE	DI-52	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		13
SIDE	DI-53	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		14
SIDE	DI-54	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		15
SIDE	DI-55	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		16
SIDE	DI-56	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		17
SIDE	DI-57	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		18
SIDE	DI-58	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		19
SIDE	DI-59	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		20
SIDE	DI-40	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		21
SIDE	DI-41	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		22
SIDE	DI-42	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		23
SIDE	DI-43	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		24
SIDE	DI-44	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		25
SIDE	DI-45	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		26
SIDE	DI-46	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		27
SIDE	DI-47	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		28
SIDE	DI-48	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		29
SIDE	DI-49	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		30
SIDE	DI-50	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		31
SIDE	DI-51	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		32
SIDE	DI-52	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		33
SIDE	DI-53	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		34
SIDE	DI-54	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		35
SIDE	DI-55	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		36
SIDE	DI-56	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		37
SIDE	DI-57	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		38
SIDE	DI-58	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		39
SIDE	DI-59	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		40
SIDE	DI-40	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		41

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD FRM BITS	S/MF	SIDE WD	SIDE FRAME	FG BT
SIDE	DI-41	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		42
SIDE	DI-42	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		43
SIDE	DI-43	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		44
SIDE	DI-44	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		45
SIDE	DI-45	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		46
SIDE	DI-46	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		47
SIDE	DI-47	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		48
SIDE	DI-48	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		49
SIDE	DI-49	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		50
SIDE	DI-50	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		51
SIDE	DI-51	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		52
SIDE	DI-52	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		53
SIDE	DI-53	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		54
SIDE	DI-54	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		55
SIDE	DI-55	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		56
SIDE	DI-56	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		57
SIDE	DI-57	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		58
SIDE	DI-58	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		59
SIDE	DI-59	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		60
SIDE	DI-40	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		61
SIDE	DI-41	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		62
SIDE	DI-42	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		63
SIDE	DI-43	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		64
SIDE	DI-44	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		65
SIDE	DI-45	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		66
SIDE	DI-46	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		67
SIDE	DI-47	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		68
SIDE	DI-48	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		69
SIDE	DI-49	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		70
SIDE	DI-50	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		71
SIDE	DI-51	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		72
SIDE	DI-52	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		73
SIDE	DI-53	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		74
SIDE	DI-54	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		75
SIDE	DI-55	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		76

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD	FRM	BITS	S/MF	SIDE WD	SIDE FRAME	FG BT
SIDE	DI-56	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		77
SIDE	DI-57	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		78
SIDE	DI-58	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		79
SIDE	DI-59	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		80
SIDE	DI-40	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		81
SIDE	DI-41	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		82
SIDE	DI-42	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		83
SIDE	DI-43	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		84
SIDE	DI-44	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		85
SIDE	DI-45	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		86
SIDE	DI-46	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		87
SIDE	DI-47	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		88
SIDE	DI-48	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		89
SIDE	DI-49	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		90
SIDE	DI-50	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		91
SIDE	DI-51	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		92
SIDE	DI-52	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		93
SIDE	DI-53	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		94
SIDE	DI-54	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		95
SIDE	DI-55	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		96
SIDE	DI-56	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		97
SIDE	DI-57	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		98
SIDE	DI-58	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		99
SIDE	DI-59	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		100
SIDE	DI-40	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		101
SIDE	DI-41	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		102
SIDE	DI-42	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		103
SIDE	DI-43	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		104
SIDE	DI-44	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		105
SIDE	DI-45	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		106
SIDE	DI-46	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		107
SIDE	DI-47	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		108
SIDE	DI-48	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		109
SIDE	DI-49	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		110
SIDE	DI-50	HECPA STEP VOLTAGE	47	EVN	3-10	6/256	3		111

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD FRM BITS	S/MF	SIDE WD	SIDE FRAME	FG BT
SIDE	DI-51	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		112
SIDE	DI-52	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		113
SIDE	DI-53	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		114
SIDE	DI-54	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		115
SIDE	DI-55	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		116
SIDE	DI-56	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		117
SIDE	DI-57	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		118
SIDE	DI-58	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		119
SIDE	DI-59	HECPA STEP VOLTAGE	47 EVN 3-10	6/256	3		120
SIDE	DI-60	HECPA STEP VOLTAGE	47 EVN 3-10	8/256	3		121
SIDE	DI-60	HECPA STEP VOLTAGE	47 EVN 3-10	8/256	3		122
SIDE	DI-60	HECPA STEP VOLTAGE	47 EVN 3-10	8/256	3		123
SIDE	DI-60	HECPA STEP VOLTAGE	47 EVN 3-10	8/256	3		124
SIDE	DI-60	HECPA STEP VOLTAGE	47 EVN 3-10	8/256	3		125
SIDE	DI-60	HECPA STEP VOLTAGE	47 EVN 3-10	8/256	3		126
SIDE	DI-60	HECPA STEP VOLTAGE	47 EVN 3-10	8/256	3		127
SIDE	DI-61	HE DATA - MSD	56 EVN 1-10	128/256	4	0-	127
SIDE	DI-62	HE DATA - LSD	63 EVN 1-10	128/256	5	0-	127
SIDE	DF-7	PARITY	15 ODD 1	128/256	6	0-	127
SIDE	DF-8	FRAME ID (11)	15 ODD 2-3	128/256	6	0-	127
SIDE	DI-63	GND PLANE STEP NO.	15 ODD 4-10	60/256	6		0
SIDE	DI-64	COMMAND REGISTER	15 ODD 4-10	24/256	6		1
SIDE	DI-63	GND PLANE STEP NO.	15 ODD 4-10	60/256	6		2
SIDE	DI-65	MODE REGISTER	15 ODD 4-10	26/256	6		3
SIDE	DI-63	GND PLANE STEP NO.	15 ODD 4-10	60/256	6		4
SIDE	DI-64	COMMAND REGISTER	15 ODD 4-10	24/256	6		5
SIDE	DI-63	GND PLANE STEP NO.	15 ODD 4-10	60/256	6		6
SIDE	DI-66	DUST COVER AND SEAL	15 ODD 4-10	4/256	6		7
SIDE	DI-63	GND PLANE STEP NO.	15 ODD 4-10	60/256	6		8
SIDE	DI-67	ELECTROMETER RANGE	15 ODD 4-10	7/256	6		9
SIDE	DI-63	GND PLANE STEP NO.	15 ODD 4-10	60/256	6		10
SIDE	DI-65	MODE REGISTER	15 ODD 4-10	26/256	6		11
SIDE	DI-63	GND PLANE STEP NO.	15 ODD 4-10	60/256	6		12
SIDE	DI-64	COMMAND REGISTER	15 ODD 4-10	24/256	6		13
SIDE	DI-63	GND PLANE STEP NO.	15 ODD 4-10	60/256	6		14

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD FRM	BITS	S/MF	SIDE WD	SIDE FRAME	FG BT
SIDE	DI-65	MODE REGISTER	15	ODD 4-10	26/256	6	15	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD 4-10	60/256	6	16	
SIDE	DI-64	COMMAND REGISTER	15	ODD 4-10	24/256	6	17	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD 4-10	60/256	6	18	
SIDE	DI-65	MODE REGISTER	15	ODD 4-10	26/256	6	19	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD 4-10	60/256	6	20	
SIDE	DI-64	COMMAND REGISTER	15	ODD 4-10	24/256	6	21	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD 4-10	60/256	6	22	
SIDE	DI-65	MODE REGISTER	15	ODD 4-10	26/256	6	23	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD 4-10	60/256	6	24	
SIDE	DI-67	ELECTROMETER RANGE	15	ODD 4-10	7/256	6	25	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD 4-10	60/256	6	26	
SIDE	DI-65	MODE REGISTER	15	ODD 4-10	26/256	6	27	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD 4-10	60/256	6	28	
SIDE	DI-64	COMMAND REGISTER	15	ODD 4-10	24/256	6	29	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD 4-10	60/256	6	30	
SIDE	DI-65	MODE REGISTER	15	ODD 4-10	26/256	6	31	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD 4-10	60/256	6	32	
SIDE	DI-64	COMMAND REGISTER	15	ODD 4-10	24/256	6	33	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD 4-10	60/256	6	34	
SIDE	DI-65	MODE REGISTER	15	ODD 4-10	26/256	6	35	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD 4-10	60/256	6	36	
SIDE	DI-64	COMMAND REGISTER	15	ODD 4-10	24/256	6	37	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD 4-10	60/256	6	38	
SIDE	DI-66	DUST COVER AND SEAL	15	ODD 4-10	4/256	6	39	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD 4-10	60/256	6	40	
SIDE	DI-67	ELECTROMETER RANGE	15	ODD 4-10	7/256	6	41	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD 4-10	60/256	6	42	
SIDE	DI-65	MODE REGISTER	15	ODD 4-10	26/256	6	43	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD 4-10	60/256	6	44	
SIDE	DI-64	COMMAND REGISTER	15	ODD 4-10	24/256	6	45	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD 4-10	60/256	6	46	
SIDE	DI-65	MODE REGISTER	15	ODD 4-10	26/256	6	47	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD 4-10	60/256	6	48	
SIDE	DI-64	COMMAND REGISTER	15	ODD 4-10	24/256	6	49	

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD	FRM	BITS	S/MF	SIDE WD	SIDE FRAME	FG BT
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	50	
SIDE	DI-65	MODE REGISTER	15	ODD	4-10	26/256	6	51	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	52	
SIDE	DI-64	COMMAND REGISTER	15	ODD	4-10	24/256	6	53	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	54	
SIDE	DI-65	MODE REGISTER	15	ODD	4-10	26/256	6	55	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	56	
SIDE	DI-67	ELECTROMETER RANGE	15	ODD	4-10	7/256	6	57	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	58	
SIDE	DI-65	MODE REGISTER	15	ODD	4-10	26/256	6	59	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	60	
SIDE	DI-64	COMMAND REGISTER	15	ODD	4-10	24/256	6	61	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	62	
SIDE	DI-65	MODE REGISTER	15	ODD	4-10	26/256	6	63	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	64	
SIDE	DI-64	COMMAND REGISTER	15	ODD	4-10	24/256	6	65	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	66	
SIDE	DI-65	MODE REGISTER	15	ODD	4-10	26/256	6	67	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	68	
SIDE	DI-64	COMMAND REGISTER	15	ODD	4-10	24/256	6	69	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	70	
SIDE	DI-66	DUST COVER AND SEAL	15	ODD	4-10	4/256	6	71	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	72	
SIDE	DI-67	ELECTROMETER RANGE	15	ODD	4-10	7/256	6	73	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	74	
SIDE	DI-65	MODE REGISTER	15	ODD	4-10	26/256	6	75	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	76	
SIDE	DI-64	COMMAND REGISTER	15	ODD	4-10	24/256	6	77	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	78	
SIDE	DI-65	MODE REGISTER	15	ODD	4-10	26/256	6	79	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	80	
SIDE	DI-64	COMMAND REGISTER	15	ODD	4-10	24/256	6	81	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	82	
SIDE	DI-65	MODE REGISTER	15	ODD	4-10	26/256	6	83	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD	4-10	60/256	6	84	

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD FRM	BITS	S/MF	SIDE WD	SIDE FRAME	FG BT
SIDE	DI-64	COMMAND REGISTER	15	ODD 4-10	24/256	6	85	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD 4-10	60/256	6	86	
SIDE	DI-65	MODE REGISTER	15	ODD 4-10	26/256	6	87	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD 4-10	60/256	6	88	
SIDE	DI-67	ELECTROMETER RANGE	15	ODD 4-10	7/256	6	89	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD 4-10	60/256	6	90	
SIDE	DI-65	MODE REGISTER	15	ODD 4-10	26/256	6	91	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD 4-10	60/256	6	92	
SIDE	DI-64	COMMAND REGISTER	15	ODD 4-10	24/256	6	93	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD 4-10	60/256	6	94	
SIDE	DI-65	MODE REGISTER	15	ODD 4-10	26/256	6	95	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD 4-10	60/256	6	96	
SIDE	DI-64	COMMAND REGISTER	15	ODD 4-10	24/256	6	97	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD 4-10	60/256	6	98	
SIDE	DI-65	MODE REGISTER	15	ODD 4-10	26/256	6	99	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD 4-10	60/256	6	100	
SIDE	DI-64	COMMAND REGISTER	15	ODD 4-10	24/256	6	101	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD 4-10	60/256	6	102	
SIDE	DI-66	DUST COVER AND SEAL	15	ODD 4-10	4/256	6	103	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD 4-10	60/256	6	104	
SIDE	DI-67	ELECTROMETER RANGE	15	ODD 4-10	7/256	6	105	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD 4-10	60/256	6	106	
SIDE	DI-65	MODE REGISTER	15	ODD 4-10	26/256	6	107	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD 4-10	60/256	6	108	
SIDE	DI-64	COMMAND REGISTER	15	ODD 4-10	24/256	6	109	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD 4-10	60/256	6	110	
SIDE	DI-65	MODE REGISTER	15	ODD 4-10	26/256	6	111	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD 4-10	60/256	6	112	
SIDE	DI-64	COMMAND REGISTER	15	ODD 4-10	24/256	6	113	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD 4-10	60/256	6	114	
SIDE	DI-65	MODE REGISTER	15	ODD 4-10	26/256	6	115	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD 4-10	60/256	6	116	
SIDE	DI-64	COMMAND REGISTER	15	ODD 4-10	24/256	6	117	
SIDE	DI-63	GND PLANE STEP NO.	15	ODD 4-10	60/256	6	118	
SIDE	DI-65	MODE REGISTER	15	ODD 4-10	26/256	6	119	

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD	FRM	BITS	S/MF	SIDE WD	SIDE FRAME	FG BT
SIDE	DI-68	CAL RATE-1 STATUS	15	ODU	4-10	2/256	6		120
SIDE	DI-69	CAL RATE-2 STATUS	15	ODU	4-10	1/256	6		121
SIDE	DI-70	CAL RATE-3 STATUS	15	ODU	4-10	2/256	6		122
SIDE	DI-71	CAL RATE-4 STATUS	15	ODU	4-10	2/256	6		123
SIDE	DI-68	CAL RATE-1 STATUS	15	ODU	4-10	2/256	6		124
SIDE	DI-64	COMMAND REGISTER	15	ODU	4-10	24/256	6		125
SIDE	DI-70	CAL RATE-3 STATUS	15	ODU	4-10	2/256	6		126
SIDE	DI-71	CAL RATE-4 STATUS	15	ODU	4-10	2/256	6		127
SIDE		FILL ZEROS	31	ODU	1-2	128/256	7	U-127	
SIDE	DI-72	VEL FILTER VOLTAGE	31	ODU	3-10	1/256	7		0
SIDE	DI-73	VEL FILTER VOLTAGE	31	ODU	3-10	1/256	7		1
SIDE	DI-74	VEL FILTER VOLTAGE	31	ODU	3-10	1/256	7		2
SIDE	DI-75	VEL FILTER VOLTAGE	31	ODU	3-10	1/256	7		3
SIDE	DI-76	VEL FILTER VOLTAGE	31	ODU	3-10	1/256	7		4
SIDE	DI-77	VEL FILTER VOLTAGE	31	ODU	3-10	1/256	7		5
SIDE	DI-78	VEL FILTER VOLTAGE	31	ODU	3-10	1/256	7		6
SIDE	DI-79	VEL FILTER VOLTAGE	31	ODU	3-10	1/256	7		7
SIDE	DI-80	VEL FILTER VOLTAGE	31	ODU	3-10	1/256	7		8
SIDE	DI-81	VEL FILTER VOLTAGE	31	ODU	3-10	1/256	7		9
SIDE	DI-82	VEL FILTER VOLTAGE	31	ODU	3-10	1/256	7		10
SIDE	DI-83	VEL FILTER VOLTAGE	31	ODU	3-10	1/256	7		11
SIDE	DI-84	VEL FILTER VOLTAGE	31	ODU	3-10	1/256	7		12
SIDE	DI-85	VEL FILTER VOLTAGE	31	ODU	3-10	1/256	7		13
SIDE	DI-86	VEL FILTER VOLTAGE	31	ODU	3-10	1/256	7		14
SIDE	DI-87	VEL FILTER VOLTAGE	31	ODU	3-10	1/256	7		15
SIDE	DI-88	VEL FILTER VOLTAGE	31	ODU	3-10	1/256	7		16
SIDE	DI-89	VEL FILTER VOLTAGE	31	ODU	3-10	1/256	7		17
SIDE	DI-90	VEL FILTER VOLTAGE	31	ODU	3-10	1/256	7		18
SIDE	DI-91	VEL FILTER VOLTAGE	31	ODU	3-10	1/256	7		19
SIDE	DI-92	VEL FILTER VOLTAGE	31	ODU	3-10	1/256	7		20
SIDE	DI-93	VEL FILTER VOLTAGE	31	ODU	3-10	1/256	7		21
SIDE	DI-94	VEL FILTER VOLTAGE	31	ODU	3-10	1/256	7		22
SIDE	DI-95	VEL FILTER VOLTAGE	31	ODU	3-10	1/256	7		23
SIDE	DI-96	VEL FILTER VOLTAGE	31	ODU	3-10	1/256	7		24
SIDE	DI-97	VEL FILTER VOLTAGE	31	ODU	3-10	1/256	7		25

EXP	MEAS		ALSEP		SIDE	SIDE	PG
NAME	NO	MEAS NAME	WD FRM BITS	S/MF	WD	FRAME	BT
SIDE	DI-98	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	26	
SIDE	DI-99	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	27	
SIDE	DJ-0	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	28	
SIDE	DJ-1	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	29	
SIDE	DJ-2	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	30	
SIDE	DJ-3	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	31	
SIDE	DJ-4	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	32	
SIDE	DJ-5	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	33	
SIDE	DJ-6	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	34	
SIDE	DJ-7	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	35	
SIDE	DJ-8	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	36	
SIDE	DJ-9	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	37	
SIDE	DJ-10	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	38	
SIDE	DJ-11	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	39	
SIDE	DJ-12	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	40	
SIDE	DJ-13	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	41	
SIDE	DJ-14	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	42	
SIDE	DJ-15	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	43	
SIDE	DJ-16	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	44	
SIDE	DJ-17	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	45	
SIDE	DJ-18	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	46	
SIDE	DJ-19	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	47	
SIDE	DJ-20	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	48	
SIDE	DJ-21	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	49	
SIDE	DJ-22	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	50	
SIDE	DJ-23	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	51	
SIDE	DJ-24	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	52	
SIDE	DJ-25	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	53	
SIDE	DJ-26	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	54	
SIDE	DJ-27	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	55	
SIDE	DJ-28	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	56	
SIDE	DJ-29	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	57	
SIDE	DJ-30	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	58	
SIDE	DJ-31	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	59	
SIDE	DJ-32	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	60	

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD FRM BITS	S/MF	SIDE WD	SIDE FRAME	FG BT
SIDE	DJ-33	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	61	
SIDE	DJ-34	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	62	
SIDE	DJ-35	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	63	
SIDE	DJ-36	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	64	
SIDE	DJ-37	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	65	
SIDE	DJ-38	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	66	
SIDE	DJ-39	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	67	
SIDE	DJ-40	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	68	
SIDE	DJ-41	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	69	
SIDE	DJ-42	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	70	
SIDE	DJ-43	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	71	
SIDE	DJ-44	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	72	
SIDE	DJ-45	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	73	
SIDE	DJ-46	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	74	
SIDE	DJ-47	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	75	
SIDE	DJ-48	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	76	
SIDE	DJ-49	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	77	
SIDE	DJ-50	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	78	
SIDE	DJ-51	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	79	
SIDE	DJ-52	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	80	
SIDE	DJ-53	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	81	
SIDE	DJ-54	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	82	
SIDE	DJ-55	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	83	
SIDE	DJ-56	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	84	
SIDE	DJ-57	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	85	
SIDE	DJ-58	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	86	
SIDE	DJ-59	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	87	
SIDE	DJ-60	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	88	
SIDE	DJ-61	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	89	
SIDE	DJ-62	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	90	
SIDE	DJ-63	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	91	
SIDE	DJ-64	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	92	
SIDE	DJ-65	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	93	
SIDE	DJ-66	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	94	
SIDE	DJ-67	VEL FILTER VOLTAGE	31 ODD 3-10	1/256	7	95	

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD	FRM	BITS	S/MF	SIDE WD	SIDE FRAME	FG BT
SIDE	DJ-68	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7		96
SIDE	DJ-69	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7		97
SIDE	DJ-70	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7		98
SIDE	DJ-71	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7		99
SIDE	DJ-72	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7		100
SIDE	DJ-73	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7		101
SIDE	DJ-74	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7		102
SIDE	DJ-75	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7		103
SIDE	DJ-76	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7		104
SIDE	DJ-77	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7		105
SIDE	DJ-78	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7		106
SIDE	DJ-79	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7		107
SIDE	DJ-80	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7		108
SIDE	DJ-81	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7		109
SIDE	DJ-82	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7		110
SIDE	DJ-83	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7		111
SIDE	DJ-84	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7		112
SIDE	DJ-85	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7		113
SIDE	DJ-86	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7		114
SIDE	DJ-87	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7		115
SIDE	DJ-88	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7		116
SIDE	DJ-89	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7		117
SIDE	DJ-90	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7		118
SIDE	DJ-91	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7		119
SIDE	DJ-92	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7		120
SIDE	DJ-93	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7		121
SIDE	DJ-94	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7		122
SIDE	DJ-95	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7		123
SIDE	DJ-96	VEL FILTER VOLTAGE	31	ODD	3-10	1/256	7		124
SIDE	DJ-97	VEL FILTER VOLTAGE	31	ODD	3-10	3/256	7		125
SIDE	DJ-97	VEL FILTER VOLTAGE	31	ODD	3-10	3/256	7		126
SIDE	DJ-97	VEL FILTER VOLTAGE	31	ODD	3-10	3/256	7		127
SIDE		FILL ZEROS	47	ODD	1-2	128/256	8	0-127	
SIDE	DJ-98	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8		0
SIDE	DJ-98	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8		1

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD	FRM	BITS	S/MF	SIDE WD	SIDE FRAME	FG BT
SIDE	DJ-98	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8		2
SIDE	DJ-98	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8		3
SIDE	DJ-98	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8		4
SIDE	DJ-98	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8		5
SIDE	DJ-98	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8		6
SIDE	DJ-98	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8		7
SIDE	DJ-98	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8		8
SIDE	DJ-98	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8		9
SIDE	DJ-98	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8		10
SIDE	DJ-98	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8		11
SIDE	DJ-98	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8		12
SIDE	DJ-98	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8		13
SIDE	DJ-98	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8		14
SIDE	DJ-98	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8		15
SIDE	DJ-98	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8		16
SIDE	DJ-98	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8		17
SIDE	DJ-98	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8		18
SIDE	DJ-98	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8		19
SIDE	DJ-99	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8		20
SIDE	DJ-99	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8		21
SIDE	DJ-99	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8		22
SIDE	DJ-99	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8		23
SIDE	DJ-99	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8		24
SIDE	DJ-99	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8		25
SIDE	DJ-99	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8		26
SIDE	DJ-99	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8		27
SIDE	DJ-99	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8		28
SIDE	DJ-99	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8		29
SIDE	DJ-99	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8		30
SIDE	DJ-99	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8		31
SIDE	DJ-99	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8		32
SIDE	DJ-99	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8		33
SIDE	DJ-99	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8		34
SIDE	DJ-99	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8		35
SIDE	DJ-99	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8		36

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD FRM	BITS	S/MF	SIDE WD	SIDE FRAME	FG BT
SIDE	DJ-99	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		37
SIDE	DJ-99	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		38
SIDE	DJ-99	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		39
SIDE	DF-0	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		40
SIDE	DF-0	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		41
SIDE	DF-0	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		42
SIDE	DF-0	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		43
SIDE	DF-0	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		44
SIDE	DF-0	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		45
SIDE	DF-0	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		46
SIDE	DF-0	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		47
SIDE	DF-0	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		48
SIDE	DF-0	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		49
SIDE	DF-0	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		50
SIDE	DF-0	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		51
SIDE	DF-0	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		52
SIDE	DF-0	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		53
SIDE	DF-0	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		54
SIDE	DF-0	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		55
SIDE	DF-0	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		56
SIDE	DF-0	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		57
SIDE	DF-0	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		58
SIDE	DF-0	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		59
SIDE	DF-1	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		60
SIDE	DF-1	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		61
SIDE	DF-1	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		62
SIDE	DF-1	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		63
SIDE	DF-1	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		64
SIDE	DF-1	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		65
SIDE	DF-1	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		66
SIDE	DF-1	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		67
SIDE	DF-1	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		68
SIDE	DF-1	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		69
SIDE	DF-1	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		70
SIDE	DF-1	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		71

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD	FRM	BITS	S/MF	SIDE WD	SIDE FRAME	FG BT
SIDE	DF-1	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8		72
SIDE	DF-1	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8		73
SIDE	DF-1	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8		74
SIDE	DF-1	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8		75
SIDE	DF-1	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8		76
SIDE	DF-1	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8		77
SIDE	DF-1	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8		78
SIDE	DF-1	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8		79
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8		80
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8		81
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8		82
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8		83
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8		84
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8		85
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8		86
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8		87
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8		88
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8		89
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8		90
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8		91
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8		92
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8		93
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8		94
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8		95
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8		96
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8		97
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8		98
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8		99
SIDE	DF-3	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8		100
SIDE	DF-3	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8		101
SIDE	DF-3	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8		102
SIDE	DF-3	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8		103
SIDE	DF-3	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8		104
SIDE	DF-3	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8		105
SIDE	DF-3	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8		106

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD	FRM	BITS	S/MF	SIDE WD	SIDE FRAME	FG BT
SIDE	DF-3	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	107	
SIDE	DF-3	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	108	
SIDE	DF-3	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	109	
SIDE	DF-3	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	110	
SIDE	DF-3	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	111	
SIDE	DF-3	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	112	
SIDE	DF-3	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	113	
SIDE	DF-3	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	114	
SIDE	DF-3	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	115	
SIDE	DF-3	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	116	
SIDE	DF-3	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	117	
SIDE	DF-3	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	118	
SIDE	DF-3	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	119	
SIDE	DF-4	LECPA STEP VOLTAGE	47	ODD	3-10	8/256	8	120	
SIDE	DF-4	LECPA STEP VOLTAGE	47	ODD	3-10	8/256	8	121	
SIDE	DF-4	LECPA STEP VOLTAGE	47	ODD	3-10	8/256	8	122	
SIDE	DF-4	LECPA STEP VOLTAGE	47	ODD	3-10	8/256	8	123	
SIDE	DF-4	LECPA STEP VOLTAGE	47	ODD	3-10	8/256	8	124	
SIDE	DF-4	LECPA STEP VOLTAGE	47	ODD	3-10	8/256	8	125	
SIDE	DF-4	LECPA STEP VOLTAGE	47	ODD	3-10	8/256	8	126	
SIDE	DF-4	LECPA STEP VOLTAGE	47	ODD	3-10	8/256	8	127	
SIDE	DF-5	LE DATA - MSD	56	ODD	1-10	128/256	9	0-127	
SIDE	DF-6	LE DATA - LSD	63	ODD	1-10	128/256	10	0-127	

1.2.1.6.3 SIDE RESET VELOCITY FILTER @9 LISTING

DOWNLINK LISTINGS COLUMN HEADERS

- Col. 1 Experiment name.
- Col. 2 Measurement number. (An asterisk in col. 11 indicates that the word is subcounted)
- Col. 3 Measurement name.
- Col. 4 ALSEP main frame (1-64) word. An asterisk in this column indicates that experiment's words are asynchronous with respect to the ALSEP main frame word.
- Col. 5 ALSEP frame. The ALSEP frame number as read from the ALSEP frame counter in ALSEP word 3. The ALSEP frame counter counts from 1-89, and then to 0, which represents 90. Columns 46-48 may contain one of the following words:
- ALL = All ALSEP main frames
 - EVN = Even numbered ALSEP main frames
 - ODD = Odd numbered ALSEP main frames.
- An asterisk in this column indicates that this parameter is asynchronous with respect to the ALSEP frame.
- Col. 6 Bits. Indicates which of the ten bits (1-10) of an ALSEP or experiment word contain the measurement number given in columns 7-11.
- Col. 7 Samples per Main Frame (S/MF). Indicates how often (on the average) a parameter appear in the ALSEP main frame.
- Col. 8 Experiment word. For the LSM these columns indicate the LSM word number (1-16)
For the SIDE these columns indicate the SIDE word number (1-10)
For the SWS these columns indicate the SWS word number (0-185)
- Col. 9 Experiment Frame. For the SWS these columns indicate the SWS sequence number (0-15)
For the SIDE these columns indicate the SIDE frame number (0-127)
- Col. 10 Flag bits.

SIDE WORDS 7&8 - RESET @9 FORMAT

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD	FRM	BITS	S/MF	SIDE WD	SIDE FRAME	FG BT
SIDE		FILL ZEROS	31	ODD	1-2	128/256	7	0-127	
SIDE		FILL ZEROS	47	ODD	1-2	128/256	8	0-127	
SIDE	DI-72	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	0	
SIDE	DI-73	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	1	
SIDE	DI-74	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	2	
SIDE	DI-75	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	3	
SIDE	DI-76	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	4	
SIDE	DI-77	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	5	
SIDE	DI-78	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	6	
SIDE	DI-79	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	7	
SIDE	DI-80	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	8	
SIDE	DI-81	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	9	
SIDE	DI-92	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	10	
SIDE	DI-93	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	11	
SIDE	DI-94	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	12	
SIDE	DI-95	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	13	
SIDE	DI-96	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	14	
SIDE	DI-97	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	15	
SIDE	DI-98	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	16	
SIDE	DI-99	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	17	
SIDE	DJ-0	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	18	
SIDE	DJ-1	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	19	
SIDE	DJ-12	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	20	
SIDE	DJ-13	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	21	
SIDE	DJ-14	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	22	
SIDE	DJ-15	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	23	
SIDE	DJ-16	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	24	
SIDE	DJ-17	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	25	
SIDE	DJ-18	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	26	
SIDE	DJ-19	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	27	
SIDE	DJ-20	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	28	
SIDE	DJ-21	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	29	
SIDE	DJ-32	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	30	
SIDE	DJ-33	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	31	
SIDE	DJ-34	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	32	

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD	FRM	BITS	S/MF	SIDE WD	SIDE FRAME	FG BT
SIDE	DJ-35	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	33	
SIDE	DJ-36	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	34	
SIDE	DJ-37	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	35	
SIDE	DJ-38	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	36	
SIDE	DJ-39	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	37	
SIDE	DJ-40	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	38	
SIDE	DJ-41	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	39	
SIDE	DJ-52	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	40	
SIDE	DJ-53	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	41	
SIDE	DJ-54	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	42	
SIDE	DJ-55	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	43	
SIDE	DJ-56	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	44	
SIDE	DJ-57	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	45	
SIDE	DJ-58	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	46	
SIDE	DJ-59	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	47	
SIDE	DJ-60	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	48	
SIDE	DJ-61	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	49	
SIDE	DJ-72	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	50	
SIDE	DJ-73	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	51	
SIDE	DJ-74	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	52	
SIDE	DJ-75	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	53	
SIDE	DJ-76	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	54	
SIDE	DJ-77	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	55	
SIDE	DJ-78	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	56	
SIDE	DJ-79	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	57	
SIDE	DJ-80	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	58	
SIDE	DJ-81	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	59	
SIDE	DI-72	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	60	
SIDE	DI-73	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	61	
SIDE	DI-74	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	62	
SIDE	DI-75	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	63	
SIDE	DI-76	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	64	
SIDE	DI-77	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	65	
SIDE	DI-78	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	66	
SIDE	DI-79	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	67	
SIDE	DI-80	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	68	
SIDE	DI-81	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	69	

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD	FRM	BITS	S/MF	SIDE WD	SIDE FRAME	FG BT
SIDE	DI-92	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	70	
SIDE	DI-93	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	71	
SIDE	DI-94	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	72	
SIDE	DI-95	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	73	
SIDE	DI-96	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	74	
SIDE	DI-97	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	75	
SIDE	DI-98	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	76	
SIDE	DI-99	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	77	
SIDE	DJ-0	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	78	
SIDE	DJ-1	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	79	
SIDE	DJ-12	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	80	
SIDE	DJ-13	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	81	
SIDE	DJ-14	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	82	
SIDE	DJ-15	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	83	
SIDE	DJ-16	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	84	
SIDE	DJ-17	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	85	
SIDE	DJ-18	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	86	
SIDE	DJ-19	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	87	
SIDE	DJ-20	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	88	
SIDE	DJ-21	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	89	
SIDE	DJ-32	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	90	
SIDE	DJ-33	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	91	
SIDE	DJ-34	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	92	
SIDE	DJ-35	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	93	
SIDE	DJ-36	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	94	
SIDE	DJ-37	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	95	
SIDE	DJ-38	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	96	
SIDE	DJ-39	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	97	
SIDE	DJ-40	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	98	
SIDE	DJ-41	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	99	
SIDE	DJ-52	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	100	
SIDE	DJ-53	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	101	
SIDE	DJ-54	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	102	
SIDE	DJ-55	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	103	
SIDE	DJ-56	VEL FILTER VOLTAGE	31	ODD	3-10	2/256	7	104	

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD	FRM	BITS	S/MF	SIDE WD	SIDE FRAME	FG BT
SIDE	DJ-57	VEL FILTER VOLTAGE	31	ODU	3-10	2/256	7	105	
SIDE	DJ-58	VEL FILTER VOLTAGE	31	ODU	3-10	2/256	7	106	
SIDE	DJ-59	VEL FILTER VOLTAGE	31	ODU	3-10	2/256	7	107	
SIDE	DJ-60	VEL FILTER VOLTAGE	31	ODU	3-10	2/256	7	108	
SIDE	DJ-61	VEL FILTER VOLTAGE	31	ODU	3-10	2/256	7	109	
SIDE	DJ-72	VEL FILTER VOLTAGE	31	ODU	3-10	2/256	7	110	
SIDE	DJ-73	VEL FILTER VOLTAGE	31	ODU	3-10	2/256	7	111	
SIDE	DJ-74	VEL FILTER VOLTAGE	31	ODU	3-10	2/256	7	112	
SIDE	DJ-75	VEL FILTER VOLTAGE	31	ODU	3-10	2/256	7	113	
SIDE	DJ-76	VEL FILTER VOLTAGE	31	ODU	3-10	2/256	7	114	
SIDE	DJ-77	VEL FILTER VOLTAGE	31	ODU	3-10	2/256	7	115	
SIDE	DJ-78	VEL FILTER VOLTAGE	31	ODU	3-10	2/256	7	116	
SIDE	DJ-79	VEL FILTER VOLTAGE	31	ODU	3-10	2/256	7	117	
SIDE	DJ-80	VEL FILTER VOLTAGE	31	ODU	3-10	2/256	7	118	
SIDE	DJ-81	VEL FILTER VOLTAGE	31	ODU	3-10	2/256	7	119	
SIDE	DJ-92	VEL FILTER VOLTAGE	31	ODU	3-10	1/256	7	120	
SIDE	DJ-93	VEL FILTER VOLTAGE	31	ODU	3-10	1/256	7	121	
SIDE	DJ-94	VEL FILTER VOLTAGE	31	ODU	3-10	1/256	7	122	
SIDE	DJ-95	VEL FILTER VOLTAGE	31	ODU	3-10	1/256	7	123	
SIDE	DJ-96	VEL FILTER VOLTAGE	31	ODU	3-10	1/256	7	124	
SIDE	DJ-97	VEL FILTER VOLTAGE	31	ODU	3-10	3/256	7	125	
SIDE	DJ-97	VEL FILTER VOLTAGE	31	ODU	3-10	3/256	7	126	
SIDE	DJ-97	VEL FILTER VOLTAGE	31	ODU	3-10	3/256	7	127	
SIDE	DJ-98	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8	0	
SIDE	DJ-98	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8	1	
SIDE	DJ-98	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8	2	
SIDE	DJ-98	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8	3	
SIDE	DJ-98	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8	4	
SIDE	DJ-98	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8	5	
SIDE	DJ-98	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8	6	
SIDE	DJ-98	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8	7	
SIDE	DJ-98	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8	8	
SIDE	DJ-98	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8	9	
SIDE	DJ-99	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8	10	
SIDE	DJ-99	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8	11	

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EXP NAME	MEAS NO	MEAS NAME	ALSEP WD FRM	BITS	S/MF	SIDE WD	SIDE FRAME	FG BT
SIDE	DJ-99	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		12
SIDE	DJ-99	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		13
SIDE	DJ-99	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		14
SIDE	DJ-99	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		15
SIDE	DJ-99	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		16
SIDE	DJ-99	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		17
SIDE	DJ-99	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		18
SIDE	DJ-99	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		19
SIDE	DF-0	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		20
SIDE	DF-0	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		21
SIDE	DF-0	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		22
SIDE	DF-0	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		23
SIDE	DF-0	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		24
SIDE	DF-0	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		25
SIDE	DF-0	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		26
SIDE	DF-0	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		27
SIDE	DF-0	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		28
SIDE	DF-0	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		29
SIDE	DF-1	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		30
SIDE	DF-1	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		31
SIDE	DF-1	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		32
SIDE	DF-1	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		33
SIDE	DF-1	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		34
SIDE	DF-1	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		35
SIDE	DF-1	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		36
SIDE	DF-1	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		37
SIDE	DF-1	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		38
SIDE	DF-1	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		39
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		40
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		41
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		42
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		43
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		44
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		45
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODD 3-10	20/256	8		46

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EXP NAME	MEAS NO	MEAS NAME	ALSEP WD	FRM	BITS	S/MF	SIDE WD	SIDE FRAME	FG BT
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8		47
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8		48
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8		49
SIDE	DF-3	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8		50
SIDE	DF-3	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8		51
SIDE	DF-3	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8		52
SIDE	DF-3	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8		53
SIDE	DF-3	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8		54
SIDE	DF-3	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8		55
SIDE	DF-3	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8		56
SIDE	DF-3	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8		57
SIDE	DF-3	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8		58
SIDE	DF-3	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8		59
SIDE	DJ-98	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8		60
SIDE	DJ-98	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8		61
SIDE	DJ-98	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8		62
SIDE	DJ-98	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8		63
SIDE	DJ-98	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8		64
SIDE	DJ-98	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8		65
SIDE	DJ-98	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8		66
SIDE	DJ-98	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8		67
SIDE	DJ-98	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8		68
SIDE	DJ-98	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8		69
SIDE	DJ-99	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8		70
SIDE	DJ-99	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8		71
SIDE	DJ-99	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8		72
SIDE	DJ-99	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8		73
SIDE	DJ-99	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8		74
SIDE	DJ-99	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8		75
SIDE	DJ-99	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8		76
SIDE	DJ-99	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8		77
SIDE	DJ-99	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8		78
SIDE	DJ-99	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8		79
SIDE	DF-0	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8		80
SIDE	DF-0	LECPA STEP VOLTAGE	47	ODU	3-10	20/256	8		81

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD	FRM	BITS	S/MF	SIDE WD	SIDE FRAME	FG BT
SIDE	DF-0	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	82	
SIDE	DF-0	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	83	
SIDE	DF-0	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	84	
SIDE	DF-0	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	85	
SIDE	DF-0	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	86	
SIDE	DF-0	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	87	
SIDE	DF-0	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	88	
SIDE	DF-0	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	89	
SIDE	DF-1	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	90	
SIDE	DF-1	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	91	
SIDE	DF-1	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	92	
SIDE	DF-1	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	93	
SIDE	DF-1	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	94	
SIDE	DF-1	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	95	
SIDE	DF-1	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	96	
SIDE	DF-1	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	97	
SIDE	DF-1	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	98	
SIDE	DF-1	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	99	
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	100	
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	101	
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	102	
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	103	
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	104	
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	105	
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	106	
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	107	
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	108	
SIDE	DF-2	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	109	
SIDE	DF-3	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	110	
SIDE	DF-3	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	111	
SIDE	DF-3	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	112	
SIDE	DF-3	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	113	
SIDE	DF-3	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	114	
SIDE	DF-3	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	115	
SIDE	DF-3	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	116	
SIDE	DF-3	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	117	
SIDE	DF-3	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	118	
SIDE	DF-3	LECPA STEP VOLTAGE	47	ODD	3-10	20/256	8	119	
SIDE	DF-4	LECPA STEP VOLTAGE	47	ODD	3-10	8/256	8	120	
SIDE	DF-4	LECPA STEP VOLTAGE	47	ODD	3-10	8/256	8	121	
SIDE	DF-4	LECPA STEP VOLTAGE	47	ODD	3-10	8/256	8	122	
SIDE	DF-4	LECPA STEP VOLTAGE	47	ODD	3-10	8/256	8	123	
SIDE	DF-4	LECPA STEP VOLTAGE	47	ODD	3-10	8/256	8	124	
SIDE	DF-4	LECPA STEP VOLTAGE	47	ODD	3-10	8/256	8	125	
SIDE	DF-4	LECPA STEP VOLTAGE	47	ODD	3-10	8/256	8	126	
SIDE	DF-4	LECPA STEP VOLTAGE	47	ODD	3-10	8/256	8	127	

1.2.1.7 HEAT FLOW EXPERIMENT (HFE)

1.2.1.7.1 DOWNLINK DESCRIPTION

The HFE is allotted word 24 in the ALSEP main frame. The HFE uses ALSEP frames 0-15 to transmit data. Frames 16-89 contain fill zeros in word 24.

There are three HFE modes: G, LK, HK. All transmit data in the same basic format. Mode G is referred to as mode 1; mode LK as mode 2; mode HK as mode 3. Modes 1 and 2 read out identical data with the exception that in mode 2, the interpretation of the data also depends on the status (ON or OFF) of the HFE probe heaters. Mode 3 reads out a different set of measurements than modes 1 and 2.

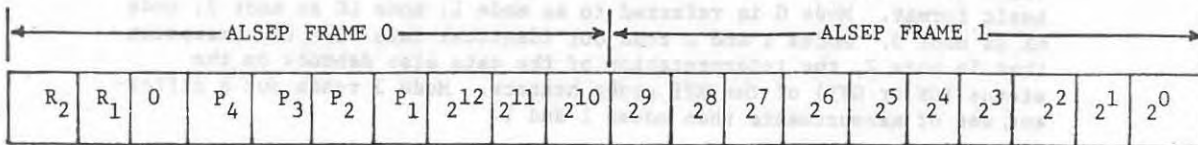
The basic HFE data format is as follows:

1 HFE word	=	2 ALSEP words	=	2 ALSEP frames	=	20 bits
4 HFE words	=	1 HFE data point	=	8 ALSEP frames		
		2 HFE data points	=	90 ALSEP frames		
1 normal HFE data cycle	=	16 HFE data points	=	720 ALSEP frames		

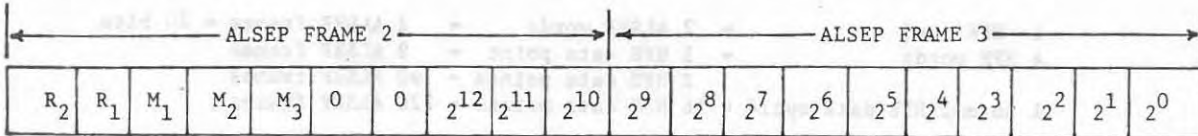
HFE DATA POINT

Bit Positions																			
1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10

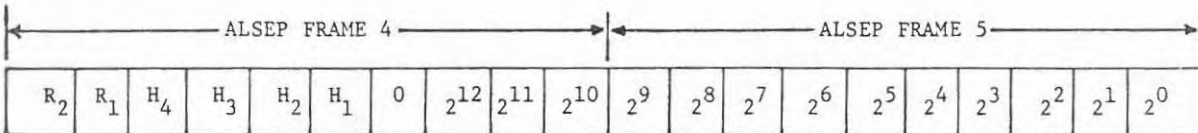
Heat Flow Word 0



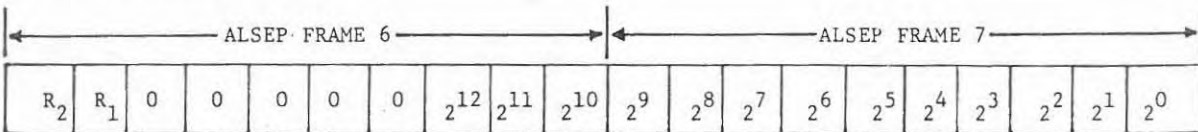
Heat Flow Word 1



Heat Flow Word 2



Heat Flow Word 3



M₁, M₂, M₃: mode registers, (100) Gradient Mode, (010) Low Conductivity Mode, and (001) High Conductivity Mode, respectively.

P₄, P₃, P₂, P₁: measurement identification

R₂, R₁: binary equivalent of Heat Flow Word.

H₄, H₃, H₂, H₁: conductivity heater registers (8 heaters)

Note: ALSEP frames 8 through 15 contain a HFE data point with a format identical to the one shown above.

In modes 1, 2, and 3 most of the measurement numbers refer to four 20-bit HFE words. These HFE words carry tag bits which completely identify the data (13 bits) in that word. In this document, the four associated HFE words are given measurement numbers of the form DH-nnA, DH-nnB, DH-nnC, DH-nnD, and are put in the parameter lists with their tag bits. There are certain measurement numbers which refer only to one 20-bit HFE word. These measurements are the HFE Thermocouple groups. The measurement numbers of the two groups are: DH-14, DH-34, DH-44 and DH-16, DH-26, DH-36, DH-46.

The HFE also contains a special group of measurements which are referred to as "tag bits" in the HFE parameter listing. They are:

- DH-90 -- Three mode bits, M1, M2, M3. 100 = mode 1, 010 = mode 2, 001 = mode 3.
- DH-91 -- Four measurement number identification bits. P4, P3, P2, P1. In mode 3, P1 in conjunction with DH-93, identifies measurement number.
- DH-92 -- Two bits, R2 and R1, which equal the binary equivalent of the HFE word.
- DH-93 -- Four heater register bits, H4, H3, H2, H1. In conjunction with DH-91, bit P1, DH-93 identifies the measurement number in HFE mode 3.

The normal HFE data cycle for modes 1 and 2 is shown in the parameter list in part 2 of this section. There are fourteen other configurations that the data can assume. The measurements in the cycle and the length of the cycle are given below.

- Normal HFE data cycle is read out. Data cycle = 720 ALSEP frames.
- DH-1, DH-2, DH-3, DH-4 are read out. Data cycle = 180 ALSEP frames.
- DH-5, DH-6, DH-7, DH-8 are read out. Data cycle = 180 ALSEP frames.
- DH-9, DH-10, DH-11, DH-12 are read out. Data cycle = 180 ALSEP frames.
- DH-13, DH-14, DH-24, DH-34, DH-44, DH-15, DH-16, DH-26, DH-36, DH-46 are read out. Data cycle = 180 frames.
- DH-1, DH-2, DH-5, DH-6, DH-9, DH-10, DH-13, DH-14, DH-24, DH-34, DH-44 are read out. Data cycle = 360 ALSEP frames.
- DH-1, DH-2 are read out. Data cycle = 90 ALSEP frames.
- DH-5, DH-6 are read out. Data cycle = 90 ALSEP frames.
- DH-9, DH-10 are read out. Data cycle = 90 ALSEP frames.
- DH-13, DH-14, DH-24, DH-34, DH-44 are read out. Data cycle = 90 ALSEP frames.
- DH-3, DH-4, DH-7, DH-8, DH-11, DH-12, DH-15, DH-16, DH-26, DH-36, DH-46 are read out. Data cycle = 360 ALSEP frames.
- DH-3, DH-4 are read out. Data cycle = 90 ALSEP frames.
- DH-7, DH-8 are read out. Data cycle = 90 ALSEP frames.
- DH-11, DH-12 are read out. Data cycle = 90 ALSEP frames.
- DH-15, DH-16, DH-26, DH-36, DH-46 are read out. Data cycle = 90 ALSEP frames.

1.2.1.7.2 HFE PARAMETER LISTING

DOWNLINK LISTINGS COLUMN HEADERS

- Col. 1 Experiment name.
- Col. 2 Measurement number. A suffix of A, B, C, or D has been added to differentiate some measurement numbers. See tag bits.
- Col. 3 Measurement name.
- Col. 4 ALSEP main frame (1-64) word. An asterisk in this column indicates that experiment's words are asynchronous with respect to the ALSEP main frame word.
- Col. 5 ALSEP frame. The ALSEP frame number as read from the ALSEP frame counter in ALSEP word 3. The ALSEP frame counter counts from 1-89, and then to 0, which represents 90. Columns 45-51 may contain one of the following words:
- ALL = All ALSEP main frames
EVN = Even numbered ALSEP main frames
ODD = Odd numbered ALSEP main frames.
- An asterisk in this column indicates that this parameter is asynchronous with respect to the ALSEP frame.
- Col. 6 Bits. Indicates which of the ten or twenty bits of an ALSEP (1-10) or experiment (1-20) word contain the measurement number given in column 2.
- Col. 7 Samples per Main Frame (S/MF). Indicates how often (on the average) a parameter appears in the ALSEP main frame.
- Col. 8 Experiment word. For the HFE this column indicates the HFE word number (0-3).
- Col. 9 P_4, P_3, P_2, P_1 - For HFE Modes 1&2 this value indicates measurement identification. For Mode 3 P_1 is used with H_4, H_3, H_2, H_1 measurement identification.
- Col. 10 R_2, R_1 . The binary equivalent of Heat Flow Word.
- Col. 11 H_4, H_3, H_2, H_1 . For HFE Mode 3 this value indicates measurement identification.

HFE Modes 1 and 2

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD	FRAMES	BIT	S/MF	HFE WD	PPPP 4321	KR 21	HHHH 4321			
HFE	DH-1A	ΔT11H	TEMP	GRAD	HIGH	SENS	24	0-1	13	1/720	0	0000	00
HFE	DH-1B	ΔT11H	TEMP	GRAD	HIGH	SENS	24	2-3	13	1/720	1	0000	01
HFE	DH-1C	ΔT11H	TEMP	GRAD	HIGH	SENS	24	4-5	13	1/720	2	0000	10
HFE	DH-1D	ΔT11H	TEMP	GRAD	HIGH	SENS	24	6-7	13	1/720	3	0000	11
HFE	DH-2A	ΔT12H	TEMP	GRAD	HIGH	SENS	24	8-9	13	1/720	0	0001	00
HFE	DH-2B	ΔT12H	TEMP	GRAD	HIGH	SENS	24	10-11	13	1/720	1	0001	01
HFE	DH-2C	ΔT12H	TEMP	GRAD	HIGH	SENS	24	12-13	13	1/720	2	0001	10
HFE	DH-2D	ΔT12H	TEMP	GRAD	HIGH	SENS	24	14-15	13	1/720	3	0001	11
HFE	DH-3A	ΔT21H	TEMP	GRAD	HIGH	SENS	24	90-91	13	1/720	0	0010	00
HFE	DH-3B	ΔT21H	TEMP	GRAD	HIGH	SENS	24	92-93	13	1/720	1	0010	01
HFE	DH-3C	ΔT21H	TEMP	GRAD	HIGH	SENS	24	94-95	13	1/720	2	0010	10
HFE	DH-3D	ΔT21H	TEMP	GRAD	HIGH	SENS	24	96-97	13	1/720	3	0010	11
HFE	DH-4A	ΔT22H	TEMP	GRAD	HIGH	SENS	24	98-99	13	1/720	0	0011	00
HFE	DH-4B	ΔT22H	TEMP	GRAD	HIGH	SENS	24	100-101	13	1/720	1	0011	01
HFE	DH-4C	ΔT22H	TEMP	GRAD	HIGH	SENS	24	102-103	13	1/720	2	0011	10
HFE	DH-4D	ΔT22H	TEMP	GRAD	HIGH	SENS	24	104-105	13	1/720	3	0011	11
HFE	DH-5A	ΔT11L	TEMP	GRAD	LOW	SENS	24	180-181	13	1/720	0	0100	00
HFE	DH-5B	ΔT11L	TEMP	GRAD	LOW	SENS	24	182-183	13	1/720	1	0100	01
HFE	DH-5C	ΔT11L	TEMP	GRAD	LOW	SENS	24	184-185	13	1/720	2	0100	10
HFE	DH-5D	ΔT11L	TEMP	GRAD	LOW	SENS	24	186-187	13	1/720	3	0100	11
HFE	DH-6A	ΔT12L	TEMP	GRAD	LOW	SENS	24	188-189	13	1/720	0	0101	00
HFE	DH-6B	ΔT12L	TEMP	GRAD	LOW	SENS	24	190-191	13	1/720	1	0101	01
HFE	DH-6C	ΔT12L	TEMP	GRAD	LOW	SENS	24	192-193	13	1/720	2	0101	10
HFE	DH-6D	ΔT12L	TEMP	GRAD	LOW	SENS	24	194-195	13	1/720	3	0101	11
HFE	DH-7A	ΔT21L	TEMP	GRAD	LOW	SENS	24	270-271	13	1/720	0	0110	00
HFE	DH-7B	ΔT21L	TEMP	GRAD	LOW	SENS	24	272-273	13	1/720	1	0110	01
HFE	DH-7C	ΔT21L	TEMP	GRAD	LOW	SENS	24	274-275	13	1/720	2	0110	10
HFE	DH-7D	ΔT21L	TEMP	GRAD	LOW	SENS	24	276-277	13	1/720	3	0110	11
HFE	DH-8A	ΔT22L	TEMP	GRAD	LOW	SENS	24	278-279	13	1/720	0	0111	00
HFE	DH-8B	ΔT22L	TEMP	GRAD	LOW	SENS	24	280-281	13	1/720	1	0111	01
HFE	DH-8C	ΔT22L	TEMP	GRAD	LOW	SENS	24	282-283	13	1/720	2	0111	10
HFE	DH-8D	ΔT22L	TEMP	GRAD	LOW	SENS	24	284-285	13	1/720	3	0111	11
HFE	DH-9A	T11	PROBE	AMBIENT	TEMP		24	360-361	13	1/720	0	1000	00
HFE	DH-9B	T11	PROBE	AMBIENT	TEMP		24	362-363	13	1/720	1	1000	01
HFE	DH-9C	T11	PROBE	AMBIENT	TEMP		24	364-365	13	1/720	2	1000	10
HFE	DH-9D	T11	PROBE	AMBIENT	TEMP		24	366-367	13	1/720	3	1000	11

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD	FRAMES	HIT	S/MF	HFE WD	PPPP 4321	RR 21	HHHH 4321			
HFE	DH-10A	T12	PROBE	AMBIENT	TEMP	24	368-369	13	1/720	0	1001	00	
HFE	DH-10B	T12	PROBE	AMBIENT	TEMP	24	370-371	13	1/720	1	1001	01	
HFE	DH-10C	T12	PROBE	AMBIENT	TEMP	24	372-373	13	1/720	2	1001	10	
HFE	DH-10D	T12	PROBE	AMBIENT	TEMP	24	374-375	13	1/720	3	1001	11	
HFE	DH-11A	T21	PROBE	AMBIENT	TEMP	24	450-451	13	1/720	0	1010	00	
HFE	DH-11B	T21	PROBE	AMBIENT	TEMP	24	452-453	13	1/720	1	1010	01	
HFE	DH-11C	T21	PROBE	AMBIENT	TEMP	24	454-455	13	1/720	2	1010	10	
HFE	DH-11D	T21	PROBE	AMBIENT	TEMP	24	456-457	13	1/720	3	1010	11	
HFE	DH-12A	T22	PROBE	AMBIENT	TEMP	24	458-459	13	1/720	0	1011	00	
HFE	DH-12B	T22	PROBE	AMBIENT	TEMP	24	460-461	13	1/720	1	1011	01	
HFE	DH-12C	T22	PROBE	AMBIENT	TEMP	24	462-463	13	1/720	2	1011	10	
HFE	DH-12D	T22	PROBE	AMBIENT	TEMP	24	464-465	13	1/720	3	1011	11	
HFE	DH-13A	REF	T1	TEMP	REF	JUNCTION	24	540-541	13	1/720	0	1100	00
HFE	DH-13B	REF	T1	TEMP	REF	JUNCTION	24	542-543	13	1/720	1	1100	01
HFE	DH-13C	REF	T1	TEMP	REF	JUNCTION	24	544-545	13	1/720	2	1100	10
HFE	DH-13D	REF	T1	TEMP	REF	JUNCTION	24	546-547	13	1/720	3	1100	11
HFE	DH-14	TC1	GROUP	PROBE	CABLE	TEMP	24	548-549	13	1/720	0	1101	00
HFE	DH-24	TC1	GROUP	PROBE	CABLE	TEMP	24	550-551	13	1/720	1	1101	01
HFE	DH-34	TC1	GROUP	PROBE	CABLE	TEMP	24	552-553	13	1/720	2	1101	10
HFE	DH-44	TC1	GROUP	PROBE	CABLE	TEMP	24	554-555	13	1/720	3	1101	11
HFE	DH-15A	REF	T2	TEMP	REF	JUNCTION	24	630-631	13	1/720	0	1110	00
HFE	DH-15B	REF	T2	TEMP	REF	JUNCTION	24	632-633	13	1/720	1	1110	01
HFE	DH-15C	REF	T2	TEMP	REF	JUNCTION	24	634-635	13	1/720	2	1110	10
HFE	DH-15D	REF	T2	TEMP	REF	JUNCTION	24	636-637	13	1/720	3	1110	11
HFE	DH-16	TC2	GROUP	PROBE	CABLE	TEMP	24	638-639	13	1/720	0	1111	00
HFE	DH-26	TC2	GROUP	PROBE	CABLE	TEMP	24	640-641	13	1/720	1	1111	01
HFE	DH-36	TC2	GROUP	PROBE	CABLE	TEMP	24	642-643	13	1/720	2	1111	10
HFE	DH-46	TC2	GROUP	PROBE	CABLE	TEMP	24	644-645	13	1/720	3	1111	11

HFE Mode 3

HFE	DH-50A	D1FF	TEMP	HTR	OFF	24	0-1	13	1/720	0	0	00	0000
HFE	DH-50B	D1FF	TEMP	HTR	OFF	24	2-3	13	1/720	1	0	01	0000
HFE	DH-50C	D1FF	TEMP	HTR	OFF	24	4-5	13	1/720	2	0	10	0000
HFE	DH-50D	D1FF	TEMP	HTR	OFF	24	6-7	13	1/720	3	0	11	0000
HFE	DH-51A	AMB	TEMP	HTR	OFF	24	8-9	13	1/720	0	1	00	0000
HFE	DH-51B	AMB	TEMP	HTR	OFF	24	10-11	13	1/720	1	1	01	0000
HFE	DH-51C	AMB	TEMP	HTR	OFF	24	12-13	13	1/720	2	1	10	0000
HFE	DH-51D	AMB	TEMP	HTR	OFF	24	14-15	13	1/720	3	1	11	0000

EXP NAME	MLAS NO	MEAS NAME	ALSEP WD FRAMES	BIT	S/MF	HFE WD	PPPP 4321	RR 21	HHHH 4321
HFE	DH-52A	DIFF TEMP HTR 12 ON	24	0-1	13 1/720	0	0 00	0001	
HFE	DH-52B	DIFF TEMP HTR 12 ON	24	2-3	13 1/720	1	0 01	0001	
HFE	DH-52C	DIFF TEMP HTR 12 ON	24	4-5	13 1/720	2	0 10	0001	
HFE	DH-52D	DIFF TEMP HTR 12 ON	24	6-7	13 1/720	3	0 11	0001	
HFE	DH-53A	AMB TEMP HTR 12 ON	24	8-9	13 1/720	0	1 00	0001	
HFE	DH-53B	AMB TEMP HTR 12 ON	24	10-11	13 1/720	1	1 01	0001	
HFE	DH-53C	AMB TEMP HTR 12 ON	24	12-13	13 1/720	2	1 10	0001	
HFE	DH-53D	AMB TEMP HTR 12 ON	24	14-15	13 1/720	3	1 11	0001	
HFE	DH-60A	DIFF TEMP HTR OFF	24	0-1	13 1/720	0	0 00	0010	
HFE	DH-60B	DIFF TEMP HTR OFF	24	2-3	13 1/720	1	0 01	0010	
HFE	DH-60C	DIFF TEMP HTR OFF	24	4-5	13 1/720	2	0 10	0010	
HFE	DH-60D	DIFF TEMP HTR OFF	24	6-7	13 1/720	3	0 11	0010	
HFE	DH-61A	AMP TEMP HTR OFF	24	8-9	13 1/720	0	1 00	0010	
HFE	DH-61B	AMP TEMP HTR OFF	24	10-11	13 1/720	1	1 01	0010	
HFE	DH-61C	AMP TEMP HTR OFF	24	12-13	13 1/720	2	1 10	0010	
HFE	DH-61D	AMP TEMP HTR OFF	24	14-15	13 1/720	3	1 11	0010	
HFE	DH-62A	DIFF TEMP HTR 14 ON	24	0-1	13 1/720	0	0 00	0011	
HFE	DH-62B	DIFF TEMP HTR 14 ON	24	2-3	13 1/720	1	0 01	0011	
HFE	DH-62C	DIFF TEMP HTR 14 ON	24	4-5	13 1/720	2	0 10	0011	
HFE	DH-62D	DIFF TEMP HTR 14 ON	24	6-7	13 1/720	3	0 11	0011	
HFE	DH-63A	AMB TEMP HTR 14 ON	24	8-9	13 1/720	0	1 00	0011	
HFE	DH-63B	AMB TEMP HTR 14 ON	24	10-11	13 1/720	1	1 01	0011	
HFE	DH-63C	AMB TEMP HTR 14 ON	24	12-13	13 1/720	2	1 10	0011	
HFE	DH-63D	AMB TEMP HTR 14 ON	24	14-15	13 1/720	3	1 11	0011	
HFE	DH-56A	DIFF TEMP HTR OFF	24	0-1	13 1/720	0	0 00	0100	
HFE	DH-56B	DIFF TEMP HTR OFF	24	2-3	13 1/720	1	0 01	0100	
HFE	DH-56C	DIFF TEMP HTR OFF	24	4-5	13 1/720	2	0 10	0100	
HFE	DH-56D	DIFF TEMP HTR OFF	24	6-7	13 1/720	3	0 11	0100	
HFE	DH-57A	AMB TEMP HTR OFF	24	8-9	13 1/720	0	1 00	0100	
HFE	DH-57B	AMB TEMP HTR OFF	24	10-11	13 1/720	1	1 01	0100	
HFE	DH-57C	AMB TEMP HTR OFF	24	12-13	13 1/720	2	1 10	0100	
HFE	DH-57D	AMB TEMP HTR OFF	24	14-15	13 1/720	3	1 11	0100	
HFE	DH-58A	DIFF TEMP HTR 11 ON	24	0-1	13 1/720	0	0 00	0101	
HFE	DH-58B	DIFF TEMP HTR 11 ON	24	2-3	13 1/720	1	0 01	0101	
HFE	DH-58C	DIFF TEMP HTR 11 ON	24	4-5	13 1/720	2	0 10	0101	
HFE	DH-58D	DIFF TEMP HTR 11 ON	24	6-7	13 1/720	3	0 11	0101	

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD	FRAMES	BIT	S/MF	HFE WD	PPPP 4321	RR 21	HHHH 4321				
HFE	DH-59A	AMB	TEMP	HTR	11	ON	24	8-9	13	1/720	0	1	00	0101
HFE	DH-59B	AMB	TEMP	HTR	11	ON	24	10-11	13	1/720	1	1	01	0101
HFE	DH-59C	AMB	TEMP	HTR	11	ON	24	12-13	13	1/720	2	1	10	0101
HFE	DH-59D	AMB	TEMP	HTR	11	ON	24	14-15	13	1/720	3	1	11	0101
HFE	DH-66A	DIFF	TEMP	HTR	OFF		24	0-1	13	1/720	0	0	00	0110
HFE	DH-66B	DIFF	TEMP	HTR	OFF		24	2-3	13	1/720	1	0	01	0110
HFE	DH-66C	DIFF	TEMP	HTR	OFF		24	4-5	13	1/720	2	0	10	0110
HFE	DH-66D	DIFF	TEMP	HTR	OFF		24	6-7	13	1/720	3	0	11	0110
HFE	DH-67A	AMB	TEMP	HTR	OFF		24	8-9	13	1/720	0	1	00	0110
HFE	DH-67B	AMB	TEMP	HTR	OFF		24	10-11	13	1/720	1	1	01	0110
HFE	DH-67C	AMB	TEMP	HTR	OFF		24	12-13	13	1/720	2	1	10	0110
HFE	DH-67D	AMB	TEMP	HTR	OFF		24	14-15	13	1/720	3	1	11	0110
HFE	DH-68A	DIFF	TEMP	HTR	13	ON	24	0-1	13	1/720	0	0	00	0111
HFE	DH-68B	DIFF	TEMP	HTR	13	ON	24	2-3	13	1/720	1	0	01	0111
HFE	DH-68C	DIFF	TEMP	HTR	13	ON	24	4-5	13	1/720	2	0	10	0111
HFE	DH-68D	DIFF	TEMP	HTR	13	ON	24	6-7	13	1/720	3	0	11	0111
HFE	DH-69A	AMB	TEMP	HTR	13	ON	24	8-9	13	1/720	0	1	00	0111
HFE	DH-69B	AMB	TEMP	HTR	13	ON	24	10-11	13	1/720	1	1	01	0111
HFE	DH-69C	AMB	TEMP	HTR	13	ON	24	12-13	13	1/720	2	1	10	0111
HFE	DH-69D	AMB	TEMP	HTR	13	ON	24	14-15	13	1/720	3	1	11	0111
HFE	DH-70A	DIFF	TEMP	HTR	OFF		24	0-1	13	1/720	0	0	00	1000
HFE	DH-70B	DIFF	TEMP	HTR	OFF		24	2-3	13	1/720	1	0	01	1000
HFE	DH-70C	DIFF	TEMP	HTR	OFF		24	4-5	13	1/720	2	0	10	1000
HFE	DH-70D	DIFF	TEMP	HTR	OFF		24	6-7	13	1/720	3	0	11	1000
HFE	DH-71A	AMB	TEMP	HTR	OFF		24	8-9	13	1/720	0	1	00	1000
HFE	DH-71B	AMB	TEMP	HTR	OFF		24	10-11	13	1/720	1	1	01	1000
HFE	DH-71C	AMB	TEMP	HTR	OFF		24	12-13	13	1/720	2	1	10	1000
HFE	DH-71D	AMB	TEMP	HTR	OFF		24	14-15	13	1/720	3	1	11	1000
HFE	DH-72A	DIFF	TEMP	HTR	22	ON	24	0-1	13	1/720	0	0	00	1001
HFE	DH-72B	DIFF	TEMP	HTR	22	ON	24	2-3	13	1/720	1	0	01	1001
HFE	DH-72C	DIFF	TEMP	HTR	22	ON	24	4-5	13	1/720	2	0	10	1001
HFE	DH-72D	DIFF	TEMP	HTR	22	ON	24	6-7	13	1/720	3	0	11	1001
HFE	DH-73A	AMB	TEMP	HTR	22	ON	24	8-9	13	1/720	0	1	00	1001
HFE	DH-73B	AMB	TEMP	HTR	22	ON	24	10-11	13	1/720	1	1	01	1001
HFE	DH-73C	AMB	TEMP	HTR	22	ON	24	12-13	13	1/720	2	1	10	1001
HFE	DH-73D	AMB	TEMP	HTR	22	ON	24	14-15	13	1/720	3	1	11	1001

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD	FRAMES	BIT	S/MF	HFE WD	PPPP 4321	RR 21	HHHH 4321
HFE	DH-80A	DIFF TEMP HTR OFF	24	0-1	13	1/720	0	0	00	1010
HFE	DH-80B	DIFF TEMP HTR OFF	24	2-3	13	1/720	1	0	01	1010
HFE	DH-80C	DIFF TEMP HTR OFF	24	4-5	13	1/720	2	0	10	1010
HFE	DH-80D	DIFF TEMP HTR OFF	24	6-7	13	1/720	3	0	11	1010
HFE	DH-81A	AMB TEMP HTR OFF	24	8-9	13	1/720	0	1	00	1010
HFE	DH-81B	AMB TEMP HTR OFF	24	10-11	13	1/720	1	1	01	1010
HFE	DH-81C	AMB TEMP HTR OFF	24	12-13	13	1/720	2	1	10	1010
HFE	DH-81D	AMB TEMP HTR OFF	24	14-15	13	1/720	3	1	11	1010
HFE	DH-82A	DIFF TEMP HTR 24 ON	24	0-1	13	1/720	0	0	00	1011
HFE	DH-82B	DIFF TEMP HTR 24 ON	24	2-3	13	1/720	1	0	01	1011
HFE	DH-82C	DIFF TEMP HTR 24 ON	24	4-5	13	1/720	2	0	10	1011
HFE	DH-82D	DIFF TEMP HTR 24 ON	24	6-7	13	1/720	3	0	11	1011
HFE	DH-83A	AMB TEMP HTR 24 ON	24	8-9	13	1/720	0	1	00	1011
HFE	DH-83B	AMB TEMP HTR 24 ON	24	10-11	13	1/720	1	1	01	1011
HFE	DH-83C	AMB TEMP HTR 24 ON	24	12-13	13	1/720	2	1	10	1011
HFE	DH-83D	AMB TEMP HTR 24 ON	24	14-15	13	1/720	3	1	11	1011
HFE	DH-76A	DIFF TEMP HTR OFF	24	0-1	13	1/720	0	0	00	1100
HFE	DH-76B	DIFF TEMP HTR OFF	24	2-3	13	1/720	1	0	01	1100
HFE	DH-76C	DIFF TEMP HTR OFF	24	4-5	13	1/720	2	0	10	1100
HFE	DH-76D	DIFF TEMP HTR OFF	24	6-7	13	1/720	3	0	11	1100
HFE	DH-77A	AMB TEMP HTR OFF	24	8-9	13	1/720	0	1	00	1100
HFE	DH-77B	AMB TEMP HTR OFF	24	10-11	13	1/720	1	1	01	1100
HFE	DH-77C	AMB TEMP HTR OFF	24	12-13	13	1/720	2	1	10	1100
HFE	DH-77D	AMB TEMP HTR OFF	24	14-15	13	1/720	3	1	11	1100
HFE	DH-78A	DIFF TEMP HTR 21 ON	24	0-1	13	1/720	0	0	00	1101
HFE	DH-78B	DIFF TEMP HTR 21 ON	24	2-3	13	1/720	1	0	01	1101
HFE	DH-78C	DIFF TEMP HTR 21 ON	24	4-5	13	1/720	2	0	10	1101
HFE	DH-78D	DIFF TEMP HTR 21 ON	24	6-7	13	1/720	3	0	11	1101
HFE	DH-79A	AMB TEMP HTR 21 ON	24	8-9	13	1/720	0	1	00	1101
HFE	DH-79B	AMB TEMP HTR 21 ON	24	10-11	13	1/720	1	1	01	1101
HFE	DH-79C	AMB TEMP HTR 21 ON	24	12-13	13	1/720	2	1	10	1101
HFE	DH-79D	AMB TEMP HTR 21 ON	24	14-15	13	1/720	3	1	11	1101
HFE	DH-86A	DIFF TEMP HTR OFF	24	0-1	13	1/720	0	0	00	1110
HFE	DH-86B	DIFF TEMP HTR OFF	24	2-3	13	1/720	1	0	01	1110
HFE	DH-86C	DIFF TEMP HTR OFF	24	4-5	13	1/720	2	0	10	1110
HFE	DH-86D	DIFF TEMP HTR OFF	24	6-7	13	1/720	3	0	11	1110

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD	FRAMES	PIT	S/MF	HFE WD	PPPP	RR	HHHH
							4321	21	4321	

HFE	DH-87A	AMB	TEMP	HTR	OFF	24	8-9	13	1/720	0	1	00	1110
HFE	DH-87B	AMB	TEMP	HTR	OFF	24	10-11	13	1/720	1	1	01	1110
HFE	DH-87C	AMB	TEMP	HTR	OFF	24	12-13	13	1/720	2	1	10	1110
HFE	DH-87D	AMB	TEMP	HTR	OFF	24	14-15	13	1/720	3	1	11	1110
HFE	DH-88A	DIFF	TEMP	HTR	23 ON	24	0-1	13	1/720	0	0	00	1111
HFE	DH-88B	DIFF	TEMP	HTR	23 ON	24	2-3	13	1/720	1	0	01	1111
HFE	DH-88C	DIFF	TEMP	HTR	23 ON	24	4-5	13	1/720	2	0	10	1111
HFE	DH-88D	DIFF	TEMP	HTR	23 ON	24	6-7	13	1/720	3	0	11	1111
HFE	DH-89A	AMB	TEMP	HTR	23 ON	24	8-9	13	1/720	0	1	00	1111
HFE	DH-89B	AMB	TEMP	HTR	23 ON	24	10-11	13	1/720	1	1	01	1111
HFE	DH-89C	AMB	TEMP	HTR	23 ON	24	12-13	13	1/720	2	1	10	1111
HFE	DH-89D	AMB	TEMP	HTR	23 ON	24	14-15	13	1/720	3	1	11	1111

APPENDIX D
APOLLO 16 - ALSEP 3

This appendix has been taken from the *Data Acquisition Plan, Annex B-1, ALSEP Telemetry Data Format Control Book*, prepared by Philco-Ford, Houston Operations, July 1972. Modifications to this material were made by Lockheed Electronics Company, Inc.

1.3 ALSEP 3, ARRAY D, APOLLO 16

1.3.1 Normal/Slow PCM Telemetry Description

1.3.1.1 GENERAL DESCRIPTION

1.3.1.1.1 Downlink Data Rates

APOLLO LUNAR SURFACE EXPERIMENTS PACKAGE (ALSEP) PCM Telemetry is downlinked at either a normal or slow data rate as shown below. The downlinked bit rate is selectable upon Earth command.

Normal Data Rate

- . 1060 bits/sec
- . 10 bits/word
- . 64 words/frame
- . 640 bits/frame
- . 0.943 ms/bit
- . 9.43 ms/word
- . 603.773 ms/frame
- . Data are transmitted MSB first (Bit 1).

Slow Data Rate

- . 530 bits/sec
- . 10 bits/word
- . 64 bits/frame
- . 640 bits/frame
- . 1.887 ms/bit
- . 18.87 ms/word
- . 1.21 sec/frame

The major subsystems included in Flight System 3 (ARRAY D) are:

I. Data System (CONT)	5 words
A. Control	
B. Command Verification	
C. Housekeeping	
* II. Passive Seismic Experiment (PSE)	43 words
* III. Lunar Surface Magnetometer Experiment (LSM)	7 words
+* IV. Heat Flow Experiment (HFE)	1 word
V. Unassigned	<u>8 words</u>
	64 words TOTAL

*The number of each experiment is mission specific and is called out in the ALSEP CDFCB

+HFE data will not appear on any ARCSAV tapes.

1.3.1.1.2 ALSEP/MAIN FRAME WORD ASSIGNMENTS

1	2	3	4	5	6	7	8
CONT.	CONT.	CONT.	PSE	LSM	PSE	* N/A	PSE
9	10	11	12	13	14	15	16
PSE	PSE	PSE	PSE	PSE	PSE	* N/A	PSE
17	18	19	20	21	22	23	24
LSM	PSE	LSM	PSE	LSM	PSE	HFE	PSE
25	26	27	28	29	30	31	32
PSE	PSE	PSE	PSE	PSE	PSE	* N/A	PSE
33	34	35	36	37	38	39	40
HOUSE-KEEPING	PSE	PSE	PSE	PSE	PSE	* N/A	PSE
41	42	43	44	45	46	47	48
PSE	PSE	PSE	PSE	PSE	COMMAND VERIFICATION	* N/A	PSE
49	50	51	52	53	54	55	56
LSM	PSE	LSM	PSE	LSM	PSE	* N/A	* N/A
57	58	59	60	61	62	63	64
PSE	PSE	PSE	PSE	PSE	PSE	* N/A	PSE

Each box contains one 10-bit word

*N/A: Not Assigned

Total bits per frame -- 10 x 64 = 640 bits

1.3.1.1.3 ALSEP MAIN FRAME PARAMETER LISTING

DOWNLINK LISTINGS COLUMN HEADERS

- | | |
|--------|--|
| Col. 1 | Experiment name. |
| Col. 2 | Measurement number. (An asterisk indicates that the word is subcommmed) |
| Col. 3 | Measurement name. |
| Col. 4 | ALSEP main frame (1-64) word. An asterisk in this column indicates that experiment's words are asynchronous with respect to the ALSEP main frame word. |
| Col. 5 | <p>ALSEP frame. The ALSEP frame number as read from the ALSEP frame counter in ALSEP word 3. The ALSEP frame counter counts from 1-89, and then to 0, which represents 90. Columns 46-48 may contain one of the following words:</p> <p>ALL = ALL ALSEP main frames
 EVN = Even numbered ALSEP main frames
 ODD = Odd numbered ALSEP main frames.</p> <p>An asterisk in this column indicates that this parameter is asynchronous with respect to the ALSEP frame.</p> |
| Col. 6 | Bits. Indicates which of the ten bits (1-10) of an ALSEP or experiment word contain the measurement number given in column 2. |
| Col. 7 | Samples per Main Frame (S/MF). Indicates how often (on the average) a parameter appears in the ALSEP main frame. |

EX. NAME	MEAS NO	MEAS NAME	ALSEP WD	FRM	BITS	S/MF
CONT	DA-1A	SYNC (1110001001)	1	ALL	1-10	1
CONT	DA-1B	SYNC (0000111011)	2	ALL	1-10	1
CONT	WD03*	SYNC, CTR, AND ID	3	ALL	1-10	1
PSE	DL-8	SP SEISMIC Z	4	ALL	1-10	29
LSM	WD05*	ENGR MEASUREMENTS	5	ALL	1-10	1
PSE	DL-8	SP SEISMIC Z	6	ALL	1-10	29
		Unassigned	7	ALL	1-10	
PSE	DL-8	SP SEISMIC Z	8	ALL	1-10	29
PSE	DL-1	LP SEISMIC X	9	ALL	1-10	4
PSE	DL-8	SP SEISMIC Z	10	ALL	1-10	29
PSE	DL-2	LP SEISMIC Y	11	ALL	1-10	4
PSE	DL-8	SP SEISMIC Z	12	ALL	1-10	29
PSE	DL-3	LP SEISMIC Z	13	ALL	1-10	4
PSE	DL-8	SP SEISMIC Z	14	ALL	1-10	29
		Unassigned	15	ALL	1-10	
PSE	DL-8	SP SEISMIC Z	16	ALL	1-10	29
LSM	DM-25	X-AXIS FIELD	17	ALL	1-10	2
PSE	DL-8	SP SEISMIC Z	18	ALL	1-10	29
LSM	DM-26	Y-AXIS FIELD	19	ALL	1-10	2
PSE	DL-8	SP SEISMIC Z	20	ALL	1-10	29
LSM	DM-27	Z-AXIS FIELD	21	ALL	1-10	2
PSE	DL-8	SP SEISMIC Z	22	ALL	1-10	29
HFE	WD23*	HFE WORDS (0-3)	23	ALL	1-10	1
PSE	DL-8	SP SEISMIC Z	24	ALL	1-10	29
PSE	DL-1	LP SEISMIC X	25	ALL	1-10	4
PSE	DL-8	SP SEISMIC Z	26	ALL	1-10	29
PSE	DL-2	LP SEISMIC Y	27	ALL	1-10	4
PSE	DL-8	SP SEISMIC Z	28	ALL	1-10	29
PSE	DL-3	LP SEISMIC Z	29	ALL	1-10	4
PSE	DL-8	SP SEISMIC Z	30	ALL	1-10	29
		Unassigned	31	ALL	1-10	
PSE	DL-8	SP SEISMIC Z	32	ALL	1-10	29
CONT	WD33*	HOUSEKEEPING	33	ALL	1-10	1
PSE	DL-8	SP SEISMIC Z	34	ALL	1-10	29
PSE	WD35*	TIDAL X OR Z	35	ALL	1-10	1

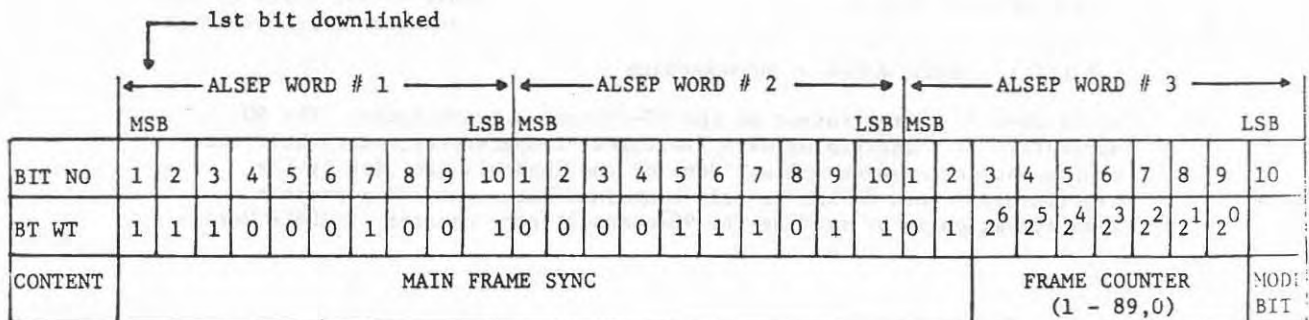
EXP NAME	MEAS NO	MEAS NAME	ALSEP WD FRM BITS	S/MF
PSE	DL-8	SP SEISMIC Z	36 ALL 1-10	29
PSE	WD37*	TIDAL Y OR SENSOR UNIT TEMP	37 ALL 1-10	1
PSE	DL-8	SP SEISMIC Z	38 ALL 1-10	29
		Unassigned	39 ALL 1-10	
PSE	DL-8	SP SEISMIC Z	40 ALL 1-10	29
PSE	DL-1	LP SEISMIC X	41 ALL 1-10	4
PSE	DL-8	SP SEISMIC Z	42 ALL 1-10	29
PSE	DL-2	LP SEISMIC Y	43 ALL 1-10	4
PSE	DL-8	SP SEISMIC Z	44 ALL 1-10	29
PSE	DL-3	LP SEISMIC Z	45 ALL 1-10	4
CON1	WD46*	CMD VERIFY & CAP WD	46 ALL 1-10	1
		Unassigned	47 ALL 1-10	
PSE	DL-8	SP SEISMIC Z	48 ALL 1-10	29
LSM	DM-25	X-AXIS FIELD	49 ALL 1-10	2
PSE	DL-8	SP SEISMIC Z	50 ALL 1-10	29
LSM	DM-26	Y-AXIS FIELD	51 ALL 1-10	2
PSE	DL-8	SP SEISMIC Z	52 ALL 1-10	29
LSM	DM-27	Z-AXIS FIELD	53 ALL 1-10	2
PSE	DL-8	SP SEISMIC Z	54 ALL 1-10	29
		Unassigned	55 ALL 1-10	
		Unassigned	56 ALL 1-10	
PSE	DL-1	LP SEISMIC X	57 ALL 1-10	4
PSE	DL-8	SP SEISMIC Z	58 ALL 1-10	29
PSE	DL-2	LP SEISMIC Y	59 ALL 1-10	4
PSE	DL-8	SP SEISMIC Z	60 ALL 1-10	29
PSE	DL-3	LP SEISMIC Z	61 ALL 1-10	4
PSE	DL-8	SP SEISMIC Z	62 ALL 1-10	29
		Unassigned	63 ALL 1-10	
PSE	DL-8	SP SEISMIC Z	64 ALL 1-10	29

1.3.1.2 ALSEP ARRAY D SYSTEM CONTROL WORDS (CONT)

Control and support of the ALSEP system is monitored through 5 main frame ALSEP words: 1, 2, 3, 33, and 46.

1.3.1.2.1 ALSEP Words 1, 2, and 3

The first 22-bits included in words 1, 2, and 3 contain the main frame sync. Bits 3 through 9 of ALSEP Word 3 contains the frame counter used to identify the parameters output by the 90-channel subcommutator. The frame counter counts from 1-89 then resets to 0 upon reaching the 90th channel. Loss of synchronization between the frame counter and 90 channel subcommutator may cause up to 54 seconds of invalid data. Bit-10 of Word 3 is the Mode Bit, which identifies Bit Rate or ALSEP ID on designated frames according to the frame counter. The configuration of the three words is as shown below:

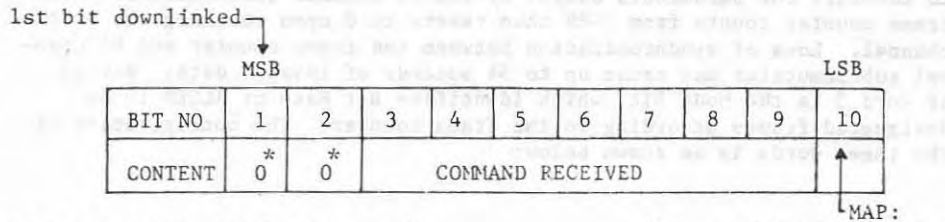


- | | |
|--------------------------|---------------|
| FRM | MODE BIT |
| 1 : 1 = Normal Data Rate | |
| 2 : 1 = Slow Data Rate | |
| 3 : 0 (MSB) | ALSEP ARRAY D |
| 4 : 0 | Data Proc. |
| 5 : 1 (LSB) | Serial No. |

Mode Bit = 0 for all other frames.

1.3.1.2.2 ALSEP Word46 - Command Verification Word

Command Verification is provided in ALSEP Word 7. The configuration is shown below. Bits 3 through 9 reflect the 7-bit command as received by the ALSEP, and bit-10 is a message acceptance pulse (MAP). The MAP reads out a "1" when an error check has been successful and a command has been acted upon. The Command Verification Word reads zeroes except during the one ALSEP main frame following receipt of a command.

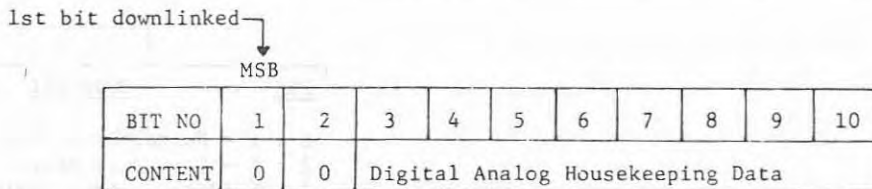


* Bits 1 and 2 will be set to the same value as bit 3.

0=Command Parity Check Failed
1=Bit by bit check of command and complement verified

1.3.1.2.3 ALSEP Word33 - Housekeeping

ALSEP Word 33 is the output of the 90-channel subcommutator. The 90 parameters of housekeeping data (voltages, temperatures, etc.) have the configuration as shown below. Some of the channels are used by the experiments. Word 33 has no self-contained data sync and parameter identification is by reading the 90-channel frame counter in ALSEP Word 3.



1.3.1.2.4 CONT PARAMETER LISTING

DOWNLINK LISTING COLUMN HEADERS

- Col. 1 Experiment name.
- Col. 2 Measurement number. (An asterisk indicates that the word is sub-commmed)
- Col. 3 Measurement name.
- Col. 4 ALSEP main frame (1-64) word. An asterisk in this column indicates that experiment's words are asynchronous with respect to the ALSEP main frame word.
- Col. 5 ALSEP frame. The ALSEP frame number as read from the ALSEP frame counter in ALSEP word 3. The ALSEP frame counter counts from 1-89, and then to 0, which represents 90. Columns 46-48 may contain one of the following words:
- ALL = All ALSEP main frames
 - EVN = Even numbered ALSEP main frames
 - ODD = Odd numbered ALSEP main frames.
- An asterisk in this column indicates that this parameter is asynchronous with respect to the ALSEP frame.
- Col. 6 Bits. Indicates which of the ten bits (1-10) of an ALSEP or experiment word contain the measurement number given in column 2.
- Col. 7 Samples per Main Frame (S/MF). Indicates how often (on the average) a parameter appears in the ALSEP main frame.

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD	FRM	BITS	S/MF
CONT	DA-1A	SYNC (1110001001)	1	ALL	1-10	1
CONT	DA-1B	SYNC (0000111011)	2	ALL	1-10	1
CONT	DA-1C	SYNC (01)	3	ALL	1-2	1
CONT	DA-2	FRAME COUNTER (1-89,0)	3	ALL	3-9	1
CONT	DA-3A	MODE, BIT RATE ID (1=NORMAL)	3	1	10	1/90
CONT	DA-3B	MODE, BIT RATE ID (1=SLOW)	3	2	10	1/90
CONT	DA-4A	MODE, ALSEP ID (0) (MSB)	3	3	10	1/90
CONT	DA-4B	MODE, ALSEP ID (0)	3	4	10	1/90
CONT	DA-4C	MODE, ALSEP ID (1) (LSB)	3	5	10	1/90
CONT		MODE, FILL ZERO	3	6-0	10	85/90
CONT	DA-7	FILL ZEROS	33	ALL	1-2	1
CONT	AE-3	CONV INPUT VOLT.	33	1	3-10	1/90
CONT	AE-1	ADC CAL 0.25V	33	2	3-10	1/90
CONT	AE-2	ADC CAL 4.75V	33	3	3-10	1/90
CONT	AT-3	THERMAL PLATE-1 TEMP	33	4	3-10	1/90
CONT	AE-4	CONV INPUT CUR	33	5	3-10	1/90
CONT	AR-1	HOT FRAME-1 TEMP	33	6	3-10	1/90
CONT	AR-4	COLD FRAME-1 TEMP	33	7	3-10	1/90
CONT	AE-5	SHUNT REG-1 CUR	33	8	3-10	1/90
CONT	AB-8	REC. A CMD SUBCARRIER STATUS.	33	9	3-10	1/90
CONT	AZ-1	TIME TO BE BISTATIC	33	10	3-10	1/90
CONT	AZ-2	FIBER 1 1/2 MOUTH # 1	33	11	3-10	1/90
CONT	AL-4	PD, EXP # 1&2	33	12	3-10	1/90
CONT	AL-6	SHUNT REG-2 CUR	33	13	3-10	1/90
CONT	AB-5	PD, EXP # 3&4 & OSS HTR 2	33	14	3-10	1/90
CONT	AT-10	BOTTOM STRUCTURE-3 TEMP	33	15	3-10	1/90
CONT	AT-40	REC. CASE TEMP	33	16	3-10	1/90
CONT	AB-9	REC. B CMD SUBCARRIER STATUS.	33	17	3-10	1/90
CONT	AT-23	XMTR A CRYSTAL TEMP	33	18	3-10	1/90
CONT	AT-24	XMTR A HEAT SINK TEMP	33	19	3-10	1/90
CONT	AE-7	PCU OUT VOLT-1(29V)	33	20	3-10	1/90
CONT	AE-19	RCVR. A INPUT SIGNAL LEVEL	33	21	3-10	1/90
CONT	AE-18	XCVR. A CURRENT	33	22	3-10	1/90
CONT	AL-1	L.P. AMPL. GAIN(X&Y)	33	23	3-10	1/90

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD FRM	BITS	S/MF
CONT	AL-5	LEV. MODE & CRS. SENS. MODE	33	24 3-10	1/90
CONT	AS-1	CENT. STAT. ELEC. TEMP.	33	25 3-10	1/90
CONT	AB-6	REC. A POWER STATUS	33	26 3-10	1/90
CONT	AT-1	SUNSHIELD-1 TEMP	33	27 3-10	1/90
CONT	AT-4	THERMAL PLATE-2 TEMP	33	28 3-10	1/90
CONT	AH-1	HFE VOLTS #1	33	29 3-10	1/90
CONT	AB-7	REC. B POWER STATUS	33	30 3-10	1/90
CONT	AT-25	XMTR B CRYSTAL TEMP	33	31 3-10	1/90
CONT	AT-26	XMTR B HEAT SINK TEMP	33	32 3-10	1/90
CONT	AT-27	ANALOG DP, BASE TEMP	33	33 3-10	1/90
CONT	AT-28	ANALOG DP, INT TEMP	33	34 3-10	1/90
CONT	AE-8	PCU OUT VOLT-2 (15V)	33	35 3-10	1/90
CONT	AE-20	REC. B INPUT SIGNAL LEVEL	33	36 3-10	1/90
CONT	AR-2	HOT FRAME #2	33	37 3-10	1/90
CONT	AL-2	L.P. AMPL. GAIN (Z)	33	38 3-10	1/90
CONT	AL-6	THERM. CTL. STAT.	33	39 3-10	1/90
CONT	AS-2	MORTAR BOX TEMP.	33	40 3-10	1/90
CONT	AB-6	SHUNT REGULATOR CURRENT PC2	33	41 3-10	1/90
CONT	AT-2	SUNSHIELD-2 TEMP	33	42 3-10	1/90
CONT	AT-5	THERMAL PLATE-3 TEMP	33	43 3-10	1/90
CONT	AS-3	GLA TEMP	33	44 3-10	1/90
CONT	AH-2	HFE VOLTS #2	33	45 3-10	1/90
CONT	AT-29	DIGITAL DP, BASE TEMP	33	46 3-10	1/90
CONT	AT-30	DIGITAL DP, INT TEMP	33	47 3-10	1/90
CONT	AT-31	CMD DECODER, BASE TEMP	33	48 3-10	1/90
CONT	AT-32	CMD DECODER, INT TEMP	33	49 3-10	1/90
CONT	AE-9	PCU OUT VOLT-3 (12V)	33	50 3-10	1/90
CONT	AE-15	XMTR. A. RF.	33	51 3-10	1/90
CONT	AR-3	HOT FRAME-3 TEMP	33	52 3-10	1/90
CONT	AL-3	LEV. DIP & SPEED	33	53 3-10	1/90
CONT	AL-7	CAL. STAT. L.P. & S.P.	33	54 3-10	1/90
CONT	AH-3	HFE VOLTS #3	33	55 3-10	1/90
CONT	AE-5	SHUNT REGULATOR CURRENT PC1	33	56 3-10	1/90
CONT	AH-6	HFE VOLTS #6	33	57 3-10	1/90
CONT	AT-6	THERMAL PLATE-4 TEMP	33	58 3-10	1/90

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD	FRM	BITS	S/MF
CONT	AT-8	LEFT SIDE STRUCTURE-1 TEMP	33	59	3-10	1/90
CONT	AT-12	INNER MULTILAYER INS TEMP	33	60	3-10	1/90
CONT	AT-33	CMD DEMOD VCO TEMP	33	61	3-10	1/90
CONT	AT-34	PDU, BASE TEMP	33	62	3-10	1/90
CONT	AT-35	PDU, INT TEMP	33	63	3-10	1/90
CONT	AT-36	PCU, POWER OSC-1 TEMP	33	64	3-10	1/90
CONT	AE-10	PCU OUT VOLT-4(5V)	33	65	3-10	1/90
CONT	AE-16	XMTR. B I F, POWER	33	66	3-10	1/90
CONT	AR-5	COLD FRAME-2 TEMP	33	67	3-10	1/90
CONT	AL-4	S.P.AMPL.GAIN(Z)	33	68	3-10	1/90
CONT	AL-8	UNCAGE STATUS	33	69	3-10	1/90
CONT	AB-10	DATA PROCESSOR STATUS	33	70	3-10	1/90
CONT	AT-7	THERMAL PLATE-5 TEMP	33	71	3-10	1/90
CONT	AT-13	OUTER MULTILAYER INS TEMP	33	72	3-10	1/90
CONT	AS-4	GEOPHONE TEMP	33	73	3-10	1/90
CONT	AH-4	HFE VOLTS #4	33	74	3-10	1/90
CONT	AH-7	HFE VOLTS #7	33	75	3-10	1/90
CONT	AT-37	PCU, POWER OSC-2 TEMP	33	76	3-10	1/90
CONT	AT-38	PCU, REGULATOR-1 TEMP	33	77	3-10	1/90
CONT	AT-39	PCU, REGULATOR-2 TEMP	33	78	3-10	1/90
CONT	AE-11	PCU, OUT VOLT-5(-12V)	33	79	3-10	1/90
CONT	AL-12	PCU, OUT VOLT-6(-6V)	33	80	3-10	1/90
CONT	AE-17	XMTR. A, CURRENT	33	81	3-10	1/90
CONT	AR-6	COLD FRAME-3	33	82	3-10	1/90
CONT		UNASSIGNED	33	83	3-10	
CONT		UNASSIGNED	33	84	3-10	
CONT		UNASSIGNED	33	85	3-10	
CONT	AZ-3	TIMER 1 1/2 MONTH # 2	33	86	3-10	1/90
CONT	AT-9	RIGHT SIDE STRUCTURE-2 TEMP	33	87	3-10	1/90
CONT	AT-11	BACK STRUCTURE-4 TEMP	33	88	3-10	1/90
CONT		UNASSIGNED	33	89	3-10	
CONT		UNASSIGNED	33	0	3-10	
CONT	DA-7	FILL ZEROS	46	ALL	1-2	1
CONT	DA-5	RECVD CMD MESSAGE	46	ALL	3-9	1
CONT	DA-6	CMD MAP	46	ALL	10	1

1.1.1.3 PASSIVE SEISMIC EXPERIMENT (PSE)

1.1.1.3.1 PSE DOWNLINK DESCRIPTION

Scientific Measurements

8 PSE scientific parameters are output in 4 ALSEP main frame words. The PSE words are 10-bits of digital converted analog data.

S.P. Z-axis data is supercommutated into 29 of the main frame words.

L.P. X-axis data, L.P. Y-axis data, and L.P. Z-axis data are supercommutated into 4 main frame words each (total of 12 main frame words).

Two main frame words, 35 and 37, contain 2-channel subcommutators. Content of the main frame words is identified by the LSB of the 90-channel frame counter in ALSEP Word 3, as follows:

LSB	ALSEP FRAME	ALSEP WORD	CONTENT
"0"	Even	35	Tidal X-Axis
"0"	Even	37	Tidal Y-Axis
"1"	Odd	35	Tidal Z-Axis
"1"	Odd	37	Sensor Unit Temp

Engineering Status

There are 8 parameters of 8-bit housekeeping data which are read out in ALSEP Word 33.

1.1.1.3.2 PSE PARAMETER LISTING

DOWNLINK LISTINGS COLUMN HEADERS

- Col. 1 Experiment name.
- Col. 2 Measurement number. (An asterisk in col. 11 indicates that the word is subcommand)
- Col. 3 Measurement name.
- Col. 4 ALSEP main frame (1-64) word. An asterisk in this column indicates that experiment's words are asynchronous with respect to the ALSEP main frame word.
- Col. 5 ALSEP frame. The ALSEP frame number as read from the ALSEP frame counter in ALSEP word 3. The ALSEP frame counter counts from 1-89, and then to 0, which represents 90. Columns 46-48 may contain one of the following words:
- ALL = All ALSEP main frames
 - EVN = Even numbered ALSEP main frames
 - ODD = Odd numbered ALSEP main frames.
- An asterisk in this column indicates that this parameter is asynchronous with respect to the ALSEP frame.
- Col. 6 Bits. Indicates which of the ten bits (1-10) of an ALSEP or experiment word contain the measurement number given in columns 7-11.
- Col. 7 Samples per Main Frame (S/MF). Indicates how often (on the average) a parameter appears in the ALSEP main frame.
- Col. 8 Experiment word. For the LSM these columns indicate the LSM word number (1-16)
For the SIDE these columns indicate the SIDE word number (1-10)
For the SWS these columns indicate the SWS word number (0-185)
- Col. 9 Experiment Frame. For the SWS these columns indicate the SWS sequence number (0-15)
For the SIDE these columns indicate the SIDE frame number (0-127)
- Col. 10 Flag bits.

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD FRM	BITS	S/MF	EXPERIMENT WD	FG FRAME	BT
PSE	DL-8	SP SEISMIC Z	4	ALL 1-10	29			
PSE	DL-8	SP SEISMIC Z	6	ALL 1-10	29			
PSE	DL-8	SP SEISMIC Z	8	ALL 1-10	29			
PSE	DL-1	LP SEISMIC X	9	ALL 1-10	4			
PSE	DL-8	SP SEISMIC Z	10	ALL 1-10	29			
PSE	DL-2	LP SEISMIC Y	11	ALL 1-10	4			
PSE	DL-8	SP SEISMIC Z	12	ALL 1-10	29			
PSE	DL-3	LP SEISMIC Z	13	ALL 1-10	4			
PSE	DL-8	SP SEISMIC Z	14	ALL 1-10	29			
PSE	DL-8	SP SEISMIC Z	16	ALL 1-10	29			
PSE	DL-8	SP SEISMIC Z	18	ALL 1-10	29			
PSE	DL-8	SP SEISMIC Z	20	ALL 1-10	29			
PSE	DL-8	SP SEISMIC Z	22	ALL 1-10	29			
PSE	DL-8	SP SEISMIC Z	24	ALL 1-10	29			
PSE	DL-1	LP SEISMIC X	25	ALL 1-10	4			
PSE	DL-8	SP SEISMIC Z	26	ALL 1-10	29			
PSE	DL-2	LP SEISMIC Y	27	ALL 1-10	4			
PSE	DL-8	SP SEISMIC Z	28	ALL 1-10	29			
PSE	DL-3	LP SEISMIC Z	29	ALL 1-10	4			
PSE	DL-8	SP SEISMIC Z	30	ALL 1-10	29			
PSE	DL-8	SP SEISMIC Z	32	ALL 1-10	29			
PSE	DL-8	SP SEISMIC Z	34	ALL 1-10	29			
PSE	DL-4	TIDAL X	35	EVN 1-10	1/2			
PSE	DL-6	TIDAL Z	35	ODD 1-10	1/2			
PSE	DL-8	SP SEISMIC Z	36	ALL 1-10	29			
PSE	DL-5	TIDAL Y	37	EVN 1-10	1/2			
PSE	DL-7	SENSOR UNIT TEMP	37	ODD 1-10	1/2			
PSE	DL-8	SP SEISMIC Z	38	ALL 1-10	29			
PSE	DL-8	SP SEISMIC Z	40	ALL 1-10	29			
PSE	DL-1	LP SEISMIC X	41	ALL 1-10	4			
PSE	DL-8	SP SEISMIC Z	42	ALL 1-10	29			
PSE	DL-2	LP SEISMIC Y	43	ALL 1-10	4			
PSE	DL-8	SP SEISMIC Z	44	ALL 1-10	29			
PSE	DL-3	LP SEISMIC Z	45	ALL 1-10	4			
PSE	DL-8	SP SEISMIC Z	48	ALL 1-10	29			
PSE	DL-8	SP SEISMIC Z	50	ALL 1-10	29			
PSE	DL-8	SP SEISMIC Z	52	ALL 1-10	29			
PSE	DL-8	SP SEISMIC Z	54	ALL 1-10	29			
PSE	DL-1	LP SEISMIC X	57	ALL 1-10	4			
PSE	DL-8	SP SEISMIC Z	58	ALL 1-10	29			
PSE	DL-2	LP SEISMIC Y	59	ALL 1-10	4			
PSE	DL-8	SP SEISMIC Z	60	ALL 1-10	29			
PSE	DL-3	LP SEISMIC Z	61	ALL 1-10	4			
PSE	DL-8	SP SEISMIC Z	62	ALL 1-10	29			
PSE	DL-8	SP SEISMIC Z	64	ALL 1-10	29			

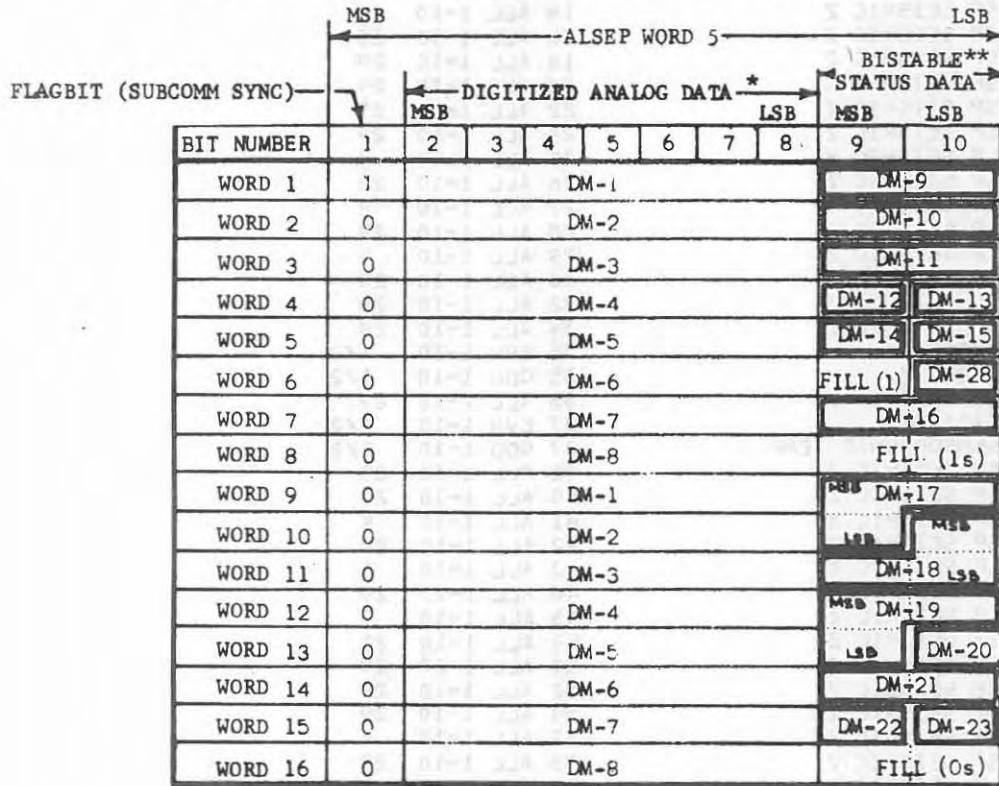
1.2.1.4 Lunar Surface Magnetometer Experiment (LSM)

1.2.1.4.1 LSM Downlink Description

The LSM is allotted words 5, 17, 19, 21, 49, 51, and 53 in the ALSEP main frame. ALSEP word 5 provides LSM engineering status, and the remaining six ALSEP words provide LSM scientific data.

Engineering Measurements

ALSEP word 5 carries a 16 channel subcomm (words 1 - 16). Since this subcomm is asynchronous with respect to the ALSEP frame count, a flagbit, to be used for subcomm sync, is placed in bit one of each word. The format of ALSEP word five is given below:

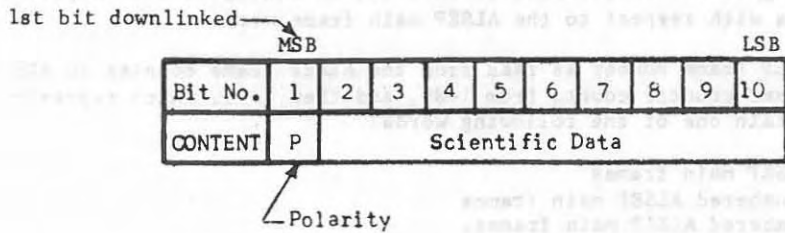


* Words 9-16, are a repeat of Words 1-8.

** 1-bit parameters show 2 states, "0" or "1"
 2-bit parameters show up to 4 states, "00" thru "11"
 3-bit parameters show up to 8 states, "000" thru "111"

Scientific Measurements

Three scientific measurements, the X-axis, Y-axis, and Z-axis measurements are supercommutated into ALSEP words 17, 19, and 21 and ALSEP words 49, 51, and 53, respectively. The bit configuration of these measurements is shown below.



0 = Plus

1 = Minus

1.2.1.4.2 LSM PARAMETER LISTING

DOWNLINK LISTINGS COLUMN HEADERS

- Col. 1 Experiment name.
- Col. 2 Measurement number. (An asterisk in col. 11 indicates that the word is subcommanded)
- Col. 3 Measurement name.
- Col. 4 ALSEP main frame (1-64) word. An asterisk in this column indicates that experiment's words are asynchronous with respect to the ALSEP main frame word.
- Col. 5 ALSEP frame. The ALSEP frame number as read from the ALSEP frame counter in ALSEP word 3. The ALSEP frame counter counts from 1-89, and then to 0, which represents 90. Columns 46-48 may contain one of the following words:
- ALL = All ALSEP main frames
 - EVN = Even numbered ALSEP main frames
 - ODD = Odd numbered ALSEP main frames.
- An asterisk in this column indicates that this parameter is asynchronous with respect to the ALSEP frame.
- Col. 6 Bits. Indicates which of the ten bits (1-10) of an ALSEP or experiment word contain the measurement number given in columns 7-11.
- Col. 7 Samples per Main Frame (S/MF). Indicates how often (on the average) a parameter appears in the ALSEP main frame.
- Col. 8 Experiment word. For the LSM these columns indicate the LSM word number (1-16)
For the SIDE these columns indicate the SIDE word number (1-10)
For the SWS these columns indicate the SWS word number (0-185)
- Col. 9 Experiment Frame. For the SWS these columns indicate the SWS sequence number (0-15)
For the SIDE these columns indicate the SIDE frame number (0-127)
- Col. 10 Flag bits.

EXP NAME	MEAS NO	MEAS NAME	ALSEP WD	FRM	BITS	S/MF	LSM WD	LSM FRAME	FG BT
LSM	DM-1	TEMP-1	5	*	2-8	2/16	1		1
LSM	DM-9	X-FLIP POSITION	5	*	9-10	1/16	1		1
LSM	DM-2	TEMP-2	5	*	2-8	2/16	2		0
LSM	DM-10	Y-FLIP POSITION	5	*	9-10	1/16	2		0
LSM	DM-3	TEMP-3	5	*	2-8	2/16	3		0
LSM	DM-11	Z-FLIP POSITION	5	*	9-10	1/16	3		0
LSM	DM-4	TEMP-4	5	*	2-8	2/16	4		0
LSM	DM-12	X-GIMBAL POSITION	5	*	9	1/16	4		0
LSM	DM-13	Y-GIMBAL POSITION	5	*	10	1/16	4		0
LSM	DM-5	TEMP-5	5	*	2-8	2/16	5		0
LSM	DM-14	Z-GIMBAL POSITION	5	*	9	1/16	5		0
LSM	DM-15	THERMAL CONTROL SELECT	5	*	10	1/16	5		0
LSM	DM-6	LEVEL SENSOR-1	5	*	2-8	2/16	6		0
LSM		FILLER BITS (1)	5	*	9	1/16	6		0
LSM	DM-28	HEATER POWER STATUS	5	*	10	1/16	6		0
LSM	DM-7	LEVEL SENSOR-2	5	*	2-8	2/16	7		0
LSM	DM-16	MEASUREMENT RANGE	5	*	9-10	1/16	7		0
LSM	DM-8	SUPPLY VOLTAGE	5	*	2-8	2/16	8		0
LSM	DM-29	FILLER BITS (ONES)	5	*	9-10	1/16	8		0
LSM	DM-1	TEMP-1	5	*	2-8	2/16	9		0
LSM	DM-17	X-OFFSET FIELD	5	*	9-10	1/16	9		0
LSM	DM-2	TEMP-2	5	*	2-8	2/16	10		0
LSM	DM-17	X-OFFSET FIELD	5	*	9	1/16	10		0
LSM	DM-18	Y-OFFSET FIELD	5	*	10	1/16	10		0
LSM	DM-3	TEMP-3	5	*	2-8	2/16	11		0
LSM	DM-18	Y-OFFSET FIELD	5	*	9-10	1/16	11		0
LSM	DM-4	TEMP-4	5	*	2-8	2/16	12		0
LSM	DM-19	Z-OFFSET FIELD	5	*	9-10	1/16	12		0
LSM	DM-5	TEMP-5	5	*	2-8	2/16	13		0
LSM	DM-19	Z-OFFSET FIELD	5	*	9	1/16	13		0
LSM	DM-20	MODE STATE	5	*	10	1/16	13		0
LSM	DM-6	LEVEL SENSOR-1	5	*	2-8	2/16	14		0
LSM	DM-21	OFFSET ADDRESS	5	*	9-10	1/16	14		0
LSM	DM-7	LEVEL SENSOR-2	5	*	2-8	2/16	15		0
LSM	DM-22	FILTER IN/OUT	5	*	9	1/16	15		0
LSM	DM-23	FLIP/CAL INHIBIT STATUS	5	*	10	1/16	15		0
LSM	DM-8	SUPPLY VOLTAGE	5	*	2-8	2/16	16		0
LSM	DM-24	FILLER BITS (ZEROS)	5	*	9-10	1/16	16		0
LSM	DM-25	X-AXIS FIELD	17	ALL	1-10	2			
LSM	DM-26	Y-AXIS FIELD	19	ALL	1-10	2			
LSM	DM-27	Z-AXIS FIELD	21	ALL	1-10	2			
LSM	DM-25	X-AXIS FIELD	49	ALL	1-10	2			
LSM	DM-26	Y-AXIS FIELD	51	ALL	1-10	2			
LSM	DM-27	Z-AXIS FIELD	53	ALL	1-10	2			

1.3.2 ACTIVE SEISMIC EXPERIMENT (ASE) TELEMETRY DESCRIPTION

1.3.2.1 ASE Downlink Description

The ASE is downlinked at 10,600 bits per second or ten times the normal data rate. The frame is broken down into 32 twenty-bit words and each word consists of 4 five-bit subwords. The parameters contained in the downlinked frame are described below.

Subwords one and two of ASE word number 1 contain the Frame Sync (DS-17). The sync word (0000111011) is followed by Geophone 2 (DS-2) and Geophone 3 (DS-3) data in subwords 3 and 4 respectively.

The first two subwords in ASE word 2 are Geophone 1 (DS-1) Data. Subword one reads out the Geophone 1 data that was sampled and stored during ASE word number 1. Then in all subsequent ASE words, subwords two, three, and four read out Geophone one, two and three data, respectively.

There are 13 parameters which require eight-bits to convey the data. These parameters are read out in the first subword of two successive ASE words. In each case the last, or 5th bit, of each subword is spare. For instance, the 1st four bits of the RTG Cold Frame Temperature-1 (AR-4) are carried in word 3 and the last four bits are carried in the first four bits of word four, i.e., in each case the first four bits are carried in the odd word and the last four bits are carried in the even.

The Mark Event Measurement (DS-18) appears in word 29, subword 1 when a Real Time Event occurs during the prior frame.

Word Count (DS-19) measures the word in the prior frame during which the Real Time Event occurred. This is read out in ASE word 30.

Event Bit Count (DS-20) measures the bit during which the Real Time Event occurred in the above word in the prior frame. This is read out in ASE Word 31.

The Mode ID (DS-13) is read out in the first 3 bits of subword one of ASE Word 32. Bits 4 and 5 of this subword are not used.

When the ASE is not operating, the following measurements are provided through ALSEP main frame word 33:

Central Station Package Temp.	AS-1
Mortar Box Temp.	AS-2
Grenade Launcher Assembly Temp.	AS-3
Geophone Temp.	AS-4

1.3.2.2 ASE PARAMETER LISTING

DOWNLINK LISTINGS COLUMN HEADERS

- Col. 1 Transmitting vehicle.
- Col. 2 Measurement number.
- Col. 3 Measurement name.
- Col. 4 Experiment name.
- Col. 5 ALSEP-ASE main frame (1-32) word.
- Col. 6 ALSEP frame. 00 = all frames.
- Col. 7 Bits. Indicates which of the twenty bits (1-20) of an ASE word contain the measurement number given in columns 9-13.
- Col. 8 Sub word. Indicates which of the four sub words (1-4) of a 20-bit ASE word contains the measurement number given in columns 9-13.

REV	TX VEH	MEAS NO	MEASUREMENT NAME	EXP NAME	ASE WD	FM	BITS	SUB WD
		ALSEP DS-17	FRAME SYNC	ASE	01	00	1-5	1
		ALSEP DS-17	FRAME SYNC	ASE	01	00	6-10	2
		ALSEP DS-1	GEOPHONE NO 1	ASE	02	00	1-5	1
		ALSEP DS-1	GEOPHONE NO 1	ASE	2-32	00	6-10	2
		ALSEP DS-2	GEOPHONE NO 2	ASE	ALL	00	11-15	3
		ALSEP DS-3	GEOPHONE NO 3	ASE	ALL	00	16-20	4
		ALSEP AR-4	RTG COLD FRM TEMP 1	ASE	03	00	1-5	1
		ALSEP AR-4	RTG COLD FRM TEMP 1	ASE	04	00	1-5	1
		ALSEP DS-7	PITCH ANGLE	ASE	05	00	1-5	1
		ALSEP DS-7	PITCH ANGLE	ASE	06	00	1-5	1
		ALSEP DS-5	GROUND MONITOR VOLTS	ASE	07	00	1-5	1
		ALSEP DS-5	GROUND MONITOR VOLTS	ASE	08	00	1-5	1
		ALSEP DS-6	ROLL ANGLE	ASE	09	00	1-5	1
		ALSEP DS-6	ROLL ANGLE	ASE	10	00	1-5	1
		ALSEP	NOT USED	ASE	11	00	1-5	1
		ALSEP	NOT USED	ASE	12	00	1-5	1
		ALSEP AS-3	GRENADE LAUNCH ASS T	ASE	13	00	1-5	1
		ALSEP AS-3	GRENADE LAUNCH ASS T	ASE	14	00	1-5	1
		ALSEP DS-8	GEOPHONE CAL PULSE	ASE	15	00	1-5	1
		ALSEP DS-8	GEOPHONE CAL PULSE	ASE	16	00	1-5	1
		ALSEP DS-11	A/D CAL 3.75V	ASE	17	00	1-5	1
		ALSEP DS-11	A/D CAL 3.75V	ASE	18	00	1-5	1
		ALSEP DS-10	A/D CAL 1.25V	ASE	19	00	1-5	1
		ALSEP DS-10	A/D CAL 1.25V	ASE	20	00	1-5	1
		ALSEP AS-1	CENTRAL STA PKGE T	ASE	21	00	1-5	1
		ALSEP AS-1	CENTRAL STA PKGE T	ASE	22	00	1-5	1
		ALSEP AE-3	CONVERTER INPUT VOLT	ASE	23	00	1-5	1
		ALSEP AE-3	CONVERTER INPUT VOLT	ASE	24	00	1-5	1
		ALSEP AE-4	INPUT CURRENT	ASE	25	00	1-5	1
		ALSEP AE-4	INPUT CURRENT	ASE	26	00	1-5	1
		ALSEP AR-1	RTG HOT FRM TEMP 1	ASE	27	00	1-5	1
		ALSEP AR-1	RTG HOT FRM TEMP 1	ASE	28	00	1-5	1
		ALSEP DS-18	MARK EVENT	ASE	29	00	1-5	1
		ALSEP DS-19	WORD COUNT	ASE	30	00	1-5	1
		ALSEP DS-20	EVENT BIT COUNT	ASE	31	00	1-5	1
		ALSEP DS-13	MODE ID	ASE	32	00	1-5	1

APPENDIX E

APOLLO 17 - ALSEP 5

This appendix has been taken from the *Data Acquisition Plan, Annex B-1, ALSEP Telemetry Data Format Control Book*, prepared by Philco-Ford, Houston Operations, July 1972. Modifications to this material were made by Lockheed Electronics Company, Inc.

- 1.5 ALSEP 5, ARRAY E, APOLLO 17
- 1.5.1 NORMAL/SLOW PCM TELEMETRY DESCRIPTION
- 1.5.1.1 GENERAL DESCRIPTION
- 1.5.1.1.1 Downlink Data Rates

APOLLO LUNAR SURFACE EXPERIMENTS PACKAGE (ALSEP) PCM Telemetry is down-linked at either a normal or slow data rate as shown below. The down-linked bit rate is selectable upon Earth command.

Normal Data Rate	Slow Data Rate
o 1060 bits/sec	o 530 bits/sec
o 10 bits/word	o 10 bits/word
o 64 words/frame	o 64 bits/frame
o 640 bits/frame	o 640 bits/frame
o 0.943 ms/bit	o 1.887 ms/bit
o 9.43 ms/word	o 18.87 ms/word
o 603.773 ms/frame	o 1.21 sec/frame
o Data are transmitted MSB first (Bit 1).	o Data are transmitted MSB first (Bit 1)

The Array E (flight model 6) consists of the following:

I.	Data Management System (CONT)	
	A. Control	3 words
	B. Command Verification	1 word
	C. Housekeeping	1 word
II.	Lunar Ejecta and Meteorite (LEAM) experiment	2 words
III.	Lunar Mass Spectrometer (LMS) experiment	4 words
IV.	Heat Flow experiment (HFE)	1 word
V.	Lunar Surface Gravimeter (LSG) experiment	36 words
VI.	Unassigned	15 words
VII.	Reserve Power	1 word
		TOTAL 64 words
VIII.	Lunar Seismic Profiling (LSP) experiment - contains its own high data rate downlink.	

1.5.1.1.2 MAIN FRAME WORD ASSIGNMENTS⁽¹⁾

1 CONT.	2 CONT.	3 CONT.	4 LSG	5 LMS	6 LSG	7 COMMAND VERIFICA- TION	8 LSG
9 N/A ⁽²⁾	10 LSG	11 N/A	12 LSG	13 N/A	14 LSG	15 N/A	16 LSG
17 LMS	18 LSG	19 LMS	20 LSG	21 LMS	22 LSG	23 HF	24 LSG
25 LSG	26 LSG	27 LSG	28 LSG	29 LSG	30 LSG	31 LEAM	32 LSG
33 HOUSE- KEEPING	34 LSG	35 LSG	36 LSG	37 LSG	38 LSG	39 LEAM	40 LSG
41 N/A	42 LSG	43 N/A	44 LSG	45 N/A	46 LSG	47 N/A	48 LSG
49 N/A	50 LSG	51 N/A	52 LSG	53 N/A	54 LSG	55 N/A	56 LSG
57 N/A	58 LSG	59 N/A	60 LSG	61 N/A	62 LSG	63 RESERVE POWER	64 LSG

(1) Each square represents 1 10-bit word. Total matrix = 10 x 64 = 640 bits/frame

(2) N/A = not assigned

1.5.1.1.3 ALSEP MAIN FRAME PARAMETER LISTING

DOWNLINK LISTINGS COLUMN HEADERS

- Col. 1 Experiment name.
- Col. 2 Measurement number. (An asterisk indicates that the word is subcommanded)
- Col. 3 Measurement name.
- Col. 4 ALSEP main frame (1-64) word. An asterisk in this column indicates that experiment's words are asynchronous with respect to the ALSEP main frame word.
- Col. 5 ALSEP frame. The ALSEP frame number as read from the ALSEP frame counter in ALSEP word 3. The ALSEP frame counter counts from 1-89, and then to 0, which represents 90. Columns 46-48 may contain one of the following words:
- ALL = ALL ALSEP main frames
 - EVN = Even numbered ALSEP main frames
 - ODD = Odd numbered ALSEP main frames.
- An asterisk in this column indicates that this parameter is asynchronous with respect to the ALSEP frame.
- Col. 6 Bits. Indicates which of the ten bits (1-10) of an ALSEP or experiment word contain the measurement number given in column 2.
- Col. 7 Samples per Main Frame (S/MF). Indicates how often (on the average) a parameter appears in the ALSEP main frame.

ALSEP ARRAY E MAIN FRAME LISTING

REV.	EXP. NAME	MEAS. NO.	MEASUREMENT NAME	ALSEP WD	FRM	BITS	S/MF
	CONT	DA-1A	SYNC (1110001001)	1	ALL	1-10	1
	CONT	DA-1B	SYNC (0000111011)	2	ALL	1-10	1
	CONT	WD03*	SYNC, CTR, AND ID	3	ALL	1-10	1
	LSG	DG-1	SEISMIC	4	ALL	1-10	31
	LMS	DM-1	COMMAND READBACK STATUS	5	ODD	1-10	.5
	LMS	DM-2	EXPERIMENT FLAG STATUS	5	EVN	1-10	.5
	LSG	DG-1	SEISMIC	6	ALL	1-10	31
	CONT	DA-5	COMMAND VERIFICATION	7	ALL	1-10	1
	LSG	DG-1	SEISMIC	8	ALL	1-10	31
			UNASSIGNED	9	ALL	1-10	
	LSG	DG-1	SEISMIC	10	ALL	1-10	31
			UNASSIGNED	11	ALL	1-10	
	LSG	DG-1	SEISMIC	12	ALL	1-10	31
			UNASSIGNED	13	ALL	1-10	
	LSG	DG-1	SEISMIC	14	ALL	1-10	31
			UNASSIGNED	15	ALL	1-10	
	LSG	DG-1	SEISMIC	16	ALL	1-10	31
	LMS	DM-3	LOW MASS (A) RANGE	17	ALL	1-10	1
	LSG	DG-1	SEISMIC	18	ALL	1-10	31
	LMS	DM-4	INTERMEDIATE MASS (B) RANGE	19	ALL	1-10	1
	LSG	DG-1	SEISMIC	20	ALL	1-10	31
	LMS	DM-5	HIGH MASS (C) RANGE	21	ALL	1-10	1
	LSG	DG-1	SEISMIC	22	ALL	1-10	31
	HFE	WD23*	HFE	23	ALL	1-10	1
	LSG	DG-1	SEISMIC	24	ALL	1-10	31
	LSG	DG-2	TIDE	25	ALL	1-10	1
	LSG	DG-1	SEISMIC	26	ALL	1-10	31
	LSG	DG-3	FREE MODE	27	ALL	1-10	1
	LSG	DG-1	SEISMIC	28	ALL	1-10	31
	LSG	DG-4	SENSOR TEMPERATURE	29	ALL	1-10	1
	LSG	DG-1	SEISMIC	30	ALL	1-10	31
	LEAM	WD31*	LEAM	31	ALL	1-10	1
	LSG	DG-1	SEISMIC	32	ALL	1-10	31
	CONT	WD33*	HOUSEKEEPING	33	ALL	1-10	1
	LSG	DG-1	SEISMIC	34	ALL	1-10	31
	LSG	DG-5	EXPERIMENT OPERATE STATUS	35	ALL	1-10	1
	LSG	DG-1	SEISMIC	36	ALL	1-10	31
	LSG	DG-6	COMMAND REGISTER STATUS	37	ALL	1-10	1
	LSG	DG-1	SEISMIC	38	ALL	1-10	31

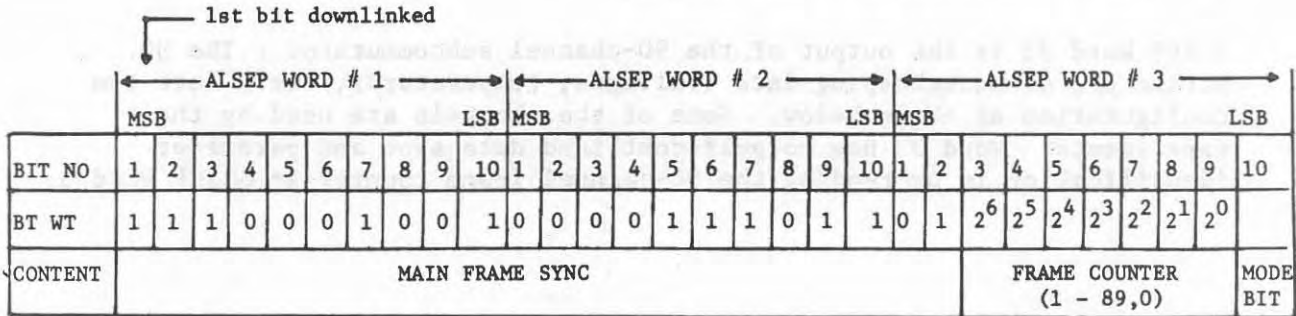
REV.	EXP. NAME	MEAS. NO.	MEASUREMENT NAME	ALSEP WD	FRM	BITS	S/MF
	LEAM	WD39*	LEAM	39	ALL	1-10	1
	LSG	DG-1	SEISMIC	40	ALL	1-10	31
			UNASSIGNED	41	ALL	1-10	
	LSG	DG-1	SEISMIC	42	ALL	1-10	31
			UNASSIGNED	43	ALL	1-10	
	LSG	DG-1	SEISMIC	44	ALL	1-10	31
			UNASSIGNED	45	ALL	1-10	
	LSG	DG-1	SEISMIC	46	ALL	1-10	31
			UNASSIGNED	47	ALL	1-10	
	LSG	DG-1	SEISMIC	48	ALL	1-10	31
			UNASSIGNED	49	ALL	1-10	
	LSG	DG-1	SEISMIC	50	ALL	1-10	31
			UNASSIGNED	51	ALL	1-10	
	LSG	DG-1	SEISMIC	52	ALL	1-10	31
			UNASSIGNED	53	ALL	1-10	
	LSG	DG-1	SEISMIC	54	ALL	1-10	31
			UNASSIGNED	55	ALL	1-10	
	LSG	DG-1	SEISMIC	56	ALL	1-10	31
			UNASSIGNED	57	ALL	1-10	
	LSG	DG-1	SEISMIC	58	ALL	1-10	31
			UNASSIGNED	59	ALL	1-10	
	LSG	DG-1	SEISMIC	60	ALL	1-10	31
			UNASSIGNED	61	ALL	1-10	
	LSG	DG-1	SEISMIC	67	ALL	1-10	31
	CONT	WD63	RESERVE POWER	63	ALL	1-10	1
	LSG	DG-1	SEISMIC	64	ALL	1-10	31

1.5.1.2 ALSEP ARRAY E SYSTEM CONTROL WORDS (CONT)

Control and support of the ALSEP system is monitored through 5 main frame ALSEP words: 1, 2, 3, 7, and 33.

1.5.1.2.1 ALSEP Words 1, 2, and 3

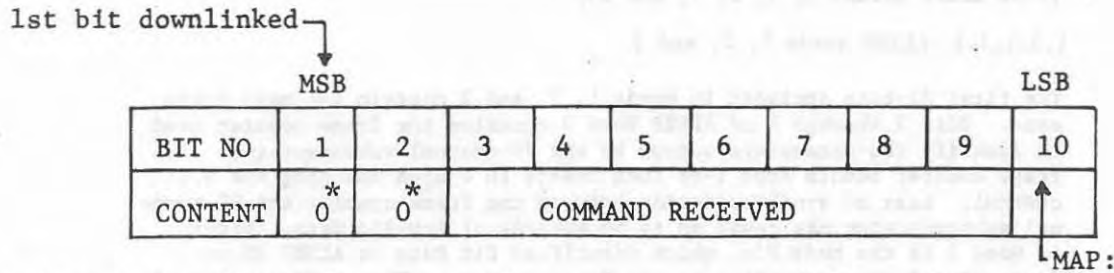
The first 22-bits included in words 1, 2, and 3 contain the main frame sync. Bits 3 through 9 of ALSEP Word 3 contains the frame counter used to identify the parameters output by the 90-channel subcommutator. The frame counter counts from 1-89 then resets to 0 upon reaching the 90th channel. Loss of synchronization between the frame counter and 90 channel subcommutator may cause up to 54 seconds of invalid data. Bit-10 of Word 3 is the Mode Bit, which identifies Bit Rate or ALSEP ID on designated frames according to the frame counter. The configuration of the three words is as shown below:



- | | |
|---------------------------|----------|
| FRM | MODE BIT |
| 1 : 1 = Normal Data Rate | |
| 2 : 1 = Slow Data Rate | |
| 3 : 1 (MSB) ALSEP ARRAY E | |
| 4 : 0 Data Proc. | |
| 5 : 0 (LSB) Serial No. | |
- Mode Bit = 0 for all other frames.

1.5.1.2.2 ALSEP Word7 - Command Verification Word

Command Verification is provided in ALSEP Word 7. The configuration is shown below. Bits 3 through 9 reflect the 7-bit command as received by the ALSEP, and bit-10 is a message acceptance pulse (MAP). The MAP reads out a "1" when an error check has been successful and a command has been acted upon. The Command Verification Word reads zeroes except during the one ALSEP main frame following receipt of a command.

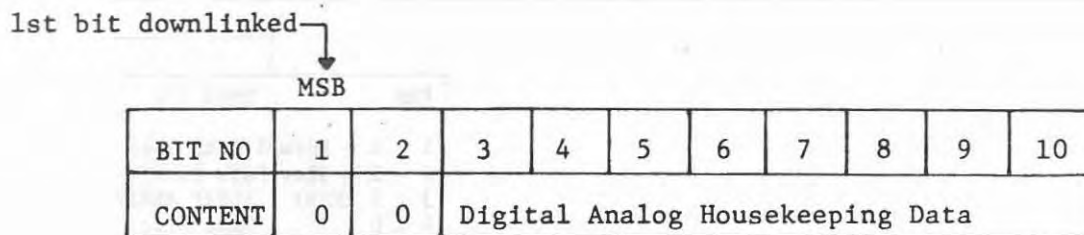


* Bits 1 and 2 will be set to the same value as bit 3.

0=Command Parity Check Failed
1=Bit by bit check of command and complement verified

1.5.1.2.3 ALSEP Word33 - Housekeeping

ALSEP Word 33 is the output of the 90-channel subcommutator. The 90 parameters of housekeeping data (voltages, temperatures, etc.) have the configuration as shown below. Some of the channels are used by the experiments. Word 33 has no self-contained data sync and parameter identification is by reading the 90-channel frame counter in ALSEP Word 3.



1.5.1.2.4 CONT PARAMETER LISTING

DOWNLINK LISTING COLUMN HEADERS

- Col. 1 Experiment name.
- Col. 2 Measurement number. (An asterisk indicates that the word is sub-commmed)
- Col. 3 Measurement name.
- Col. 4 ALSEP main frame (1-64) word. An asterisk in this column indicates that experiment's words are asynchronous with respect to the ALSEP main frame word.
- Col. 5 ALSEP frame. The ALSEP frame number as read from the ALSEP frame counter in ALSEP word 3. The ALSEP frame counter counts from 1-89, and then to 0, which represents 90. Columns 46-48 may contain one of the following words:
- ALL = All ALSEP main frames
 - EVN = Even numbered ALSEP main frames
 - ODD = Odd numbered ALSEP main frames.
- An asterisk in this column indicates that this parameter is asynchronous with respect to the ALSEP frame.
- Col. 6 Bits. Indicates which of the ten bits (1-10) of an ALSEP or experiment word contain the measurement number given in column 2.
- Col. 7 Samples per Main Frame (S/MF). Indicates how often (on the average) a parameter appears in the ALSEP main frame.

A. ALSEP ARRAY E CONT PARAMETER LIST

REV.	EXP.	MEAS.	MEASUREMENT NAME	ALSEP	FRM	BITS	S/MF
	NAME	NO.		WD			
CONT	DA-1A		SYNC (1110001001)	1	ALL	1-10	1
CONT	DA-1B		SYNC (0000111011)	2	ALL	1-10	1
CONT	DA-1C		SYNC (01)	3	ALL	1-2	1
CONT	DA-2		FRAME COUNTER (1-89.0)	3	ALL	3-9	1
CONT	DA-3A		MODE,BIT RATE ID (1=NORMAL)	3	1	10	1/90
CONT	DA-3B		MODE,BIT RATE ID (1=SLOW)	3	2	10	1/90
CONT	DA-4A		MODE,ALSEP ID (1) (MSB)	3	3	10	1/90
CONT	DA-4B		MODE,ALSEP ID (0)	3	4	10	1/90
CONT	DA-4C		MODE,ALSEP ID (0) (LSB)	3	5	10	1/90
CONT			MODE,FILL ZERO	3	6-0	10	85/90
CONT	DA-7		FILL	7	ALL	1-2	1
CONT	DA-5		RECV D CMD MESSAGE	7	ALL	3-9	1
CONT	DA-6		CMD MAP	7	ALL	10	1
CONT	DA-9		FILL ZEROS	33	ALL	1-2	1
CONT	AB-18		UPLINK SWITCH DELAY STATUS	33	1	3-10	1/90
CONT	AE-1		ADC CAL 0.25V	33	2	3-10	1/90
CONT	AE-2		ADC CAL 4.75V	33	3	3-10	1/90
CONT	AT-3		THERMAL PLATE-1 TEMP	33	4	3-10	1/90
CONT	AE-4		PCU INPUT CUR	33	5	3-10	1/90
CONT	AR-1		RTG HOT FRAME-1 TEMP	33	6	3-10	1/90
CONT	AR-4		RTG COLD FRAME-1 TEMP	33	7	3-10	1/90
CONT	AE-3		PC #1 INPUT VOLTAGE	33	8	3-10	1/90
CONT	AB-8		REC. A CMD SUBCARRIER STATUS	33	9	3-10	1/90
CONT	AG-2		LSG TIDE SIGNAL	33	10	3-10	1/90
CONT	AE-23		PC #2 INPUT VOLTAGE	33	11	3-10	1/90
CONT	AB-4		EXP #1&2 POWER STATUS	33	12	3-10	1/90
CONT	AB-16		PCU AUTO CHANGE SENSOR STATUS	33	13	3-10	1/90
CONT	AB-5		EXP #3&4 POWER STATUS	33	14	3-10	1/90
CONT	AT-10		BOTTOM STRUCTURE-3 TEMP	33	15	3-10	1/90
CONT	AT-40		REC. CASE TEMP UPLINK A ONLY	33	16	3-10	1/90
CONT	AB-9		REC B CMD SUBCARRIER STATUS	33	17	3-10	1/90
CONT	AT-23		XMTR A POWER AMP TEMP	33	18	3-10	1/90
CONT	AT-24		XMTR A CASE TEMP	33	19	3-10	1/90
CONT	AE-7		+29 VOLTS	33	20	3-10	1/90
CONT	AE-19		RCVR. A INPUT SIGNAL LEVEL	33	21	3-10	1/90
CONT	AE-18		XMTR B, 23-VOLT	33	22	3-10	1/90
CONT	AG-3		LSG FREE MODE OSCILLATION SIG	33	23	3-10	1/90

REV.	EXP. NAME	MEAS. NO.	MEASUREMENT NAME	ALSEP WD	FRM	BITS	S/MF
CONT	AG-7		LSG OSCILLATOR AMPLITUDE	33	24	3-10	1/90
CONT	AP-1		LSP ELEC INT. TEMP	33	25	3-10	1/90
CONT	AB-6		REC. A POWER STATUS	33	26	3-10	1/90
CONT	AT-1		SUNSHIELD-1 TEMP	33	27	3-10	1/90
CONT	AT-4		THERMAL PLATE-2 TEMP	33	28	3-10	1/90
CONT	AH-1		HFE VOLTS #1	33	29	3-10	1/90
CONT	AE-24		RESERVE POWER	33	30	3-10	1/90
CONT	AT-25		XMTR B POWER AMP TEMP	33	31	3-10	1/90
CONT	AT-26		XMTR B CASE TEMP	33	32	3-10	1/90
CONT	AT-27		ANALOG DP, BASE TEMP	33	33	3-10	1/90
CONT	AT-28		ANALOG DP, INT TEMP	33	34	3-10	1/90
CONT	AE-21		APM #1 POWER	33	35	3-10	1/90
CONT	AE-20		REC. B INPUT SIGNAL LEVEL	33	36	3-10	1/90
CONT	AR-2		RTG HOT FRAME #2	33	37	3-10	1/90
CONT	AG-8		LSG POWER CONVERTER(+15V)	33	-38	3-10	1/90
CONT	AG-1		LSG SEISMIC SIGNAL	33	39	3-10	1/90
CONT			SUBCOM 16 FUNCTIONS	33	40	3-10	1/90
CONT	AM-41		LMS ELECTRONICS TEMPERATURE	33	41	3-10	1/90
CONT	AT-2		SUNSHIELD-2 TEMP	33	42	3-10	1/90
CONT	AT-5		THERMAL PLATE-3 TEMP	33	43	3-10	1/90
CONT	AM-44		LMS SWEEP HIGH VOLTAGE	33	44	3-10	1/90
CONT	AH-2		HFE VOLTS #2	33	45	3-10	1/90
CONT	AT-14		FRONT STRUCTURE TEMP	33	46	3-10	1/90
CONT	AT-15		REAR STRUCTURE TEMP	33	47	3-10	1/90
CONT	AT-31		CMD DECODER B DEMOD TEMP	33	48	3-10	1/90
CONT	AT-32		CMD DECODER A DEMOD TEMP	33	49	3-10	1/90
CONT	AE-9		+12 VOLTS	33	50	3-10	1/90
CONT	AE-15		XMTR. A. 17 VOLT, CURRENT	33	51	3-10	1/90
CONT	AR-3		RTG HOT FRAME-3 TEMP	33	52	3-10	1/90
CONT	AG-9		LSG POWER CONVERTER(-15V)	33	-53	3-10	1/90
CONT	AG-6		LSG MASS POSITION SIG.	33	54	3-10	1/90
CONT	AH-3		HFE VOLTS #3	33	55	3-10	1/90
CONT	AE-22		APM #2 POWER	33	56	3-10	1/90
CONT	AH-6		HFE HI COND HEATER PWR STATUS	33	57	3-10	1/90
CONT	AT-6		THERMAL PLATE-4 TEMP	33	58	3-10	1/90
CONT	AT-8		LEFT SIDE STRUCTURE-1 TEMP	33	59	3-10	1/90
CONT	AT-12		THERMAL BAG INNER TEMP	33	60	3-10	1/90
CONT	AT-41		AMP #1 TEMP	33	61	3-10	1/90
CONT	AT-34		PDU #1 TEMP	33	62	3-10	1/90

1.5-10

REV.	EXP.	MEAS.	MEASUREMENT NAME	ALSEP	FRM	BITS	S/MF
	NAME	NO.		WD			
CONT	AT-35	PDU #2	TEMP	33	63	3-10	1/90
CONT	AT-42	APM #2	TEMP	33	64	3-10	1/90
CONT	AE-10	+5	VOLTS	33	65	3-10	1/90
CONT	AE-16	XMTR. B	17 VOLT CURRENT	33	66	3-10	1/90
CONT	AR-5	RTG COLD	FRAME-2 TEMP	33	67	3-10	1/90
CONT	AG-4	LSG	SENSOR TEMP	33	68	3-10	1/90
CONT	AG-10	LSG	POWER CONVERTER	33	69	3-10	1/90
CONT	AB-10	DDP	X/Y STATUS	33	70	3-10	1/90
CONT	AT-7	THERMAL	PLATE-5 TEMP	33	71	3-10	1/90
CONT	AT-13	THERMAL	BAG OUTER TEMP	33	72	3-10	1/90
CONT	AB-11	EXP #5	POWER STATUS	33	73	3-10	1/90
CONT	AH-4	HFE	VOLTS #4	33	74	3-10	1/90
CONT	AH-7	HFE	LO COND HEATER PWR STATUS	33	75	3-10	1/90
CONT	AB-13	APM	ON/OFF STATUS	33	76	3-10	1/90
CONT	AT-38	PCU, REGULATOR-1	TEMP	33	77	3-10	1/90
CONT	AT-39	PCU, REGULATOR-2	TEMP	33	78	3-10	1/90
CONT	AE-11	-12	VOLTS	33	79	3-10	1/90
CONT	AB-14	7W/14W	EXTERNAL LOAD STATUS	33	80	3-10	1/90
CONT	AE-17	XMTR. A,	23 VOLT	33	81	3-10	1/90
CONT	AR-6	COLD	FRAME-3	33	82	3-10	1/90
CONT		SUBCOM	5 FUNCTIONS	33	83	3-10	1/90
CONT		SUBCOM	5 FUNCTIONS	33	84	3-10	1/90
CONT	AJ-11	LEAM	ELEC. SURVIVAL TEMP	33	85	3-10	1/90
CONT	AB-15	CMD	DECODER PERIODIC STATUS	33	86	3-10	1/90
CONT	AT-9	RIGHT	SIDE STRUCTURE-2 TEMP	33	87	3-10	1/90
CONT	AT-11	POWER	DUMP MODULE TEMP	33	88	3-10	1/90
CONT	AG-5	LSG	INSTR. HOUSING PRESS.	33	89	3-10	1/90
CONT	AB-17	ADP	X/Y AND POWER STATUS	33	90	3-10	1/90
CONT	DA-9	FILL	ZEROS	63	ALL	1-2	1
CONT	DA-8	RESERVE	POWER	63	ALL	3-10	1

B. CHANNEL 40 SUBCOM 16 FUNCTIONS

The LMS submultiplexes 16 functions into ALSEP word 33, channel 40, bits 3-10. One measurement is read out on channel 40 during each 90 frame sequence.

MEAS. NO.	SUBCOM SEQ.	MEASUREMENT NAME
AM-1	1	MARKER ID (11111111)
AM-2	2	EXPERIMENT CURRENT MONITOR
AM-3	3	ION PUMP CURRENT
AM-4	4	ION PUMP VOLTAGE
AM-5	5	BASEPLATE TEMPERATURE
AM-6	6	ION SOURCE TEMPERATURE
AM-7	7	+12 VDC SUPPLY VOLTAGE
AM-8	8	+5 VDC SUPPLY VOLTAGE
AM-9	9	-12 VDC SUPPLY VOLTAGE
AM-10	10	-15 VDC SUPPLY VOLTAGE
AM-11	11	EMISSION CURRENT MONITOR
AM-12	12	FILAMENT #1 CURRENT MONITOR
AM-13	13	FILAMENT #2 CURRENT MONITOR
AM-14	14	MULTIPLIER HIGH VOLTAGE MONITOR
AM-15	15	LOW VOLTAGE POWER SUPPLY TEMPERATURE
AM-16	16	UNASSIGNED

C. CHANNELS 83 & 84 SUBCOM 5 FUNCTIONS

The LEAM submultiplexes five measurements into ALSEP word 33, channel 83, bits 3-10 and word 33, channel 84, bits 3-10.

MEAS. NO.	ALSEP CHANNEL	SUBCOM SEQ.	MEASUREMENT NAME
AJ-1-	83	1+	LEAM +5 VOLT SUPPLY
AJ-2-	83	2	LEAM SENSOR DUST COVERS STATUS
AJ-3	83	3	LEAM MIRROR DUST COVER STATUS
AJ-4	83	4	LEAM POWER SUPPLY MONITOR
AJ-5	83	5	LEAM BIAS VOLTAGES MONITOR
AJ-6	84	1	LEAM UP MICROPHONE TEMP
AJ-7	84	2	LEAM EAST MICROPHONE TEMP
AJ-8	84	3	LEAM WEST MICROPHONE TEMP
AJ-9	84	4	LEAM CENTRAL ELECTRONIC TEMP
AJ-10	84	5	LEAM -5 VOLT SUPPLY

1.5.1.3 LUNAR MASS SPECTROMETER (LMS) EXPERIMENT

1.5.1.3.1 LMS Downlink Description

The LMS outputs scientific measurements in ALSEP main frame words 5, 17, 19, and 21. Housekeeping measurements are output in ALSEP main frame word 33, channels 40, 41, and 44.

The ion counters use a floating point accumulator type of data compression circuitry to convert 21 bit count numbers into 10 data bits which are downlinked as 10-bit measurements. To achieve this type of compression, the following steps must be performed by equipment within the experiment:

1. The contents of a 21 bit data register are transferred to a 21 bit shift register.
2. The data is then shifted, bit by bit, from LSB to MSB until the MSB of the shift register is set to one, or 14 bit shifts have occurred, whichever ever comes first.
3. The number of bit shifts performed is stored in a 4-bit shift count register.
4. If 14 bit shifts are performed and the MSB of the shift register is still not set to one, the shifting process will stop and the 4-bit shift count register will be set to show a count of 15.
5. The MSB-1 is not downlinked. The MSB-2 bit through the MSB-7 bit are then placed in the six most significant bits of the 10-bit data word and the contents of the 4-bit shift count register are placed in the 4 least significant bits of the 10-bit data word.

The 10-bit compressed counts are downlinked in words 17, 19, and 21.

Ground processing so as to restore the numeric count should be done as follows:

1. If the six bit data portion of the downlink word is represented by D and the shift counter is represented by S, then if S is less than or equal to 14 the equation $(D + 64) \cdot 2^{(14-S)}$ will give the value of the original counter.
2. If S equals 15, then the value D is the count before compression.

Two examples follow.

1. Shift Count = 14, MSB ≠ 1

Original Count Buffer

Bit Weight																				64	32	16	8	4	2	1
Bit No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21					
Bit Value	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0					

Shift Register after Shift

Bit No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Bit Value	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Shift Count Register

Bit No.	1	2	3	4
Bit Value	1	1	1	1

Downlink Word

	MSB								LSB	
Bit No.	1	2	3	4	5	6	7	8	9	10
Bit Value	1	0	0	0	0	0	1	1	1	1

Data will be restored as follows:

S = 15, therefore D is original count

D = 100 000 = 32

2. Shift Count = 14, MSB = 1

Original Count Buffer

Bit Weight															64	32	16	8	4	2	1
Bit No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Bit Value	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0

Shift Register after Shift

Bit No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Bit Value	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Shift Count Register

Bit No.	1	2	3	4
Bit Value	1	1	1	0

Downlink Word

Bit No.	1	2	3	4	5	6	7	8	9	10
Bit Value	0	0	0	0	0	0	1	1	1	0

Data will be restored as follows:

$$S = 14, \text{ therefore original count} = (D + 64) \cdot 2^{(14-S)}$$

$$D = 000\ 000 = 0$$

$$\text{Count} = (64) \cdot 2^{14-14} = 64 \cdot 2^0 = 64$$

ALSEP word 5 is used to output the digital status data from the LMS.
 The bit assignments within the word are as follows:

Bit Number	1	2	3	4	5	6	7	8	9	10
CONTENT EVEN FRAME	DM-11	DM-12	DM-13	DM-14	DM-15	DM-16	DM-17	DM-18	DM-19	DM-20
CONTENT ODD FRAME	DM-11	← SPARE →			← DM-1 →					

LMS Command Register Function Loads (DM-1)

Binary Bit Value	Decimal	Function
1 2 3 4 5 6 (1)		
5 6 7 8 9 10 (2)		
0 0 0 0 0 0	0	Register cleared
0 0 0 0 0 1	1	Load command #6
0 0 0 0 1 0	2	Load command #5
0 0 0 0 1 1	3	Ion pump, mult and sweep HV off
0 0 0 1 0 0	4	Load command #4
0 0 0 1 0 1	5	Ion pump on
0 0 0 1 1 0	6	Dust cover removal
0 0 1 0 0 0	8	Load command #3
0 0 1 0 0 1	9	Bakeout Disable
0 0 1 0 1 0	10	Bakeout Enable
0 0 1 1 0 0	12	Disc. Low and J-Plate voltage step inhibit
0 1 0 0 0 0	16	Load command #2
0 1 0 0 0 1	17	Disc. high and J-Plate voltage step enable
0 1 0 0 1 0	18	Mult. low
0 1 0 1 0 0	20	Mult. high and backup heater on
0 1 1 0 0 0	24	Filament #2 on
1 0 0 0 0 0	32	Load command #1
1 0 0 0 0 1	33	Filament #1 on
1 0 0 0 1 0	34	Emission/Filaments off
1 0 0 1 0 0	36	One-step (sweep advance)
1 0 1 0 0 0	40	Lock (sweep/hold) and J-Plate voltage step
1 1 0 0 0 0	48	Step, mult, sweep HV on and backup heater off
1 1 1 1 1 1	63	Set for register clear

(1) Measurement bit number

(2) ALSEP Word bit number

Mass Step Status (DM-14)

The mass step status bit = 0 during the 20 ALSEP frames containing the Background and Calibration data; i.e., a string of ten bits set to zero is received in the Auto Step Mode.

Word 5 Even Frame Definition

Bit Number	Measurement Number	Measurement Name	Bit Meaning
1	DM-11	Frame ID	0 = Odd Frame 1 = Even Frame
2	DM-12	Multiplier Voltage Status	0 = Low 1 = High
3	DM-13	Discriminator Level Status	0 = Low 1 = High
4	DM-14	Mass Step Status	0 = BKG/CAL 1 = Sweeping
5	DM-15	Auto Step-Lock (Manual) Status	0 = Lock 1 = Auto Step
6	DM-16	Ion Pump Status	0 = Off 1 = On
7	DM-17	Dust Cover Status	0 = In Place 1 = Removed
8	DM-18	Bake Out Heater Status	0 = Bypass 1 = Enable
9	DM-19	Mult. and Sweep HV Status	0 = Off 1 = On
10	DM-20	Filaments Status	0 = Off 1 = On

1.5.1.3.2 LMS PARAMETER LISTING

DOWNLINK LISTINGS COLUMN HEADERS

- Col. 1 Experiment name.
- Col. 2 Measurement number. (An asterisk indicates that the word is subcommanded)
- Col. 3 Measurement name.
- Col. 4 ALSEP main frame (1-64) word. An asterisk in this column indicates that experiment's words are asynchronous with respect to the ALSEP main frame word.
- Col. 5 ALSEP frame. The ALSEP frame number as read from the ALSEP frame counter in ALSEP word 3. The ALSEP frame counter counts from 1-89, and then to 0, which represents 90. Columns 46-48 may contain one of the following words:
 - ALL = All ALSEP main frames
 - EVN = Even numbered ALSEP main frames
 - ODD = Odd numbered ALSEP main frames.An asterisk in this column indicates that this parameter is asynchronous with respect to the ALSEP frame.
- Col. 6 Bits. Indicates which of the ten bits (1-10) of an ALSEP or experiment word contain the measurement number given in column 2.
- Col. 7 Samples per Main Frame (S/MF). Indicates how often (on the average) a parameter appears in the ALSEP main frame.

REV	EXP. NAME	MEAS. NO.	MEASUREMENT NAME	ALSEP		BITS	S/MF
				WD	FRM		
	LMS	DM-1	Command Readback Status	5	Odd	5-10	0.5
		DM-11	Frame ID	5	All	1	1.0
		DM-12	Multiplier Voltage Status	5	Even	2	0.5
		DM-13	Discriminator Level Status	5	Even	3	0.5
		DM-14	Mass Step Status	5	Even	4	0.5
		DM-15	Auto Step-Lock (Manual) Status	5	Even	5	0.5
		DM-16	Ion Pump Status	5	Even	6	0.5
		DM-17	Dust Cover Status	5	Even	7	0.5
		DM-18	Bakeout Heater Status	5	Even	8	0.5
		DM-19	Mult. and Sweep HV Status	5	Even	9	0.5
		DM-20	Filaments Status	5	Even	10	0.5
		DM-3	Low Mass (A) Range	17	All	1-10	1.0
		DM-4	Intermediate Mass (B) Range	19	All	1-10	1.0
		DM-5	High Mass (C) Range	21	All	1-10	1.0

1.5.1.4 LUNAR EJECTA AND METEORITE (LEAM) EXPERIMENT

1.5.1.4.1 LEAM Downlink Description

The LEAM uses 2 ALSEP main frame words (words 31 and 39) to multiplex 10 10-bit words for output. The 10 LEAM words contain 31 scientific measurements as follows:

LEAM Word	ALSEP Word	LEAM Bit Position									
		MSB	1	2	3	4	5	6	7	8	9
1	31			DJ-1			DJ-2			DJ-3	
2	39			DJ-4			DJ-5			DJ-6	
3	31			DJ-7			DJ-8			DJ-9	
4	39			DJ-10				DJ-11			
5	31			DJ-12			DJ-13			DJ-14	
6	39			DJ-15			DJ-16			DJ-17	
7	31			DJ-18			DJ-19			DJ-20	
8	39			DJ-21				DJ-22			
9	31	DJ-23			DJ-24		DJ-25			DJ-26	
10	39	DJ-27		DJ-28	DJ-29		DJ-30			DJ-31	

1.5.1.4.2 LEAM PARAMETER LISTING

DOWNLINK LISTINGS COLUMN HEADERS

- Col. 1 Experiment name.
- Col. 2 Measurement number. (An asterisk indicates that the word is subcommented)
- Col. 3 Measurement name.
- Col. 4 ALSEP main frame (1-64) word. An asterisk in this column indicates that experiment's words are asynchronous with respect to the ALSEP main frame word.
- Col. 5 ALSEP frame. The ALSEP frame number as read from the ALSEP frame counter in ALSEP word 3. The ALSEP frame counter counts from 1-89, and then to 0, which represents 90. Columns 46-48 may contain one of the following words:
- ALL = All ALSEP main frames
 - EVN = Even numbered ALSEP main frames
 - ODD = Odd numbered ALSEP main frames.
- An asterisk in this column indicates that this parameter is asynchronous with respect to the ALSEP frame.
- Col. 6 Bits. Indicates which of the ten bits (1-10) of an ALSEP or experiment word contain the measurement number given in column 2.
- Col. 7 Samples per Main Frame (S/MF). Indicates how often (on the average) a parameter appears in the ALSEP main frame.
- Col. 8 Experiment word. For the LEAM this column indicates the LEAM word number (1-10).

REV.	EXP. NAME	MEAS. NO.	MEASUREMENT NAME	ALSEP		BITS	S/MF	EXP. WD
				WD	FRM ⁽¹⁾			
	LEAM	DJ-1	FRONT FILM ID	31	1	1-4	1	1
	LEAM	DJ-2	FRONT FILM PHA	31	1	5-7	1	1
	LEAM	DJ-3	FRONT FILM ACCUMULATOR	31	1	8-10	1	1
	LEAM	DJ-4	REAR FILM ID	39	1	1-4	1	2
	LEAM	DJ-5	REAR FILM PHA	39	1	5-7	1	2
	LEAM	DJ-6	REAR FILM ACCUMULATOR	39	1	8-10	1	2
	LEAM	DJ-7	FRONT COLLECTOR ID	31	2	1-4	1	3
	LEAM	DJ-8	MICROPHONE PHA	31	2	5-7	1	3
	LEAM	DJ-9	MICROPHONE ACCUMULATOR	31	2	8-10	1	3
	LEAM	DJ-10	REAR COLLECTOR ID	39	2	1-4	1	4
	LEAM	DJ-11	ELAPSED TIME	39	2	5-10	1	4
	LEAM	DJ-12	FRONT FILM ID	31	3	1-4	1	5
	LEAM	DJ-13	FRONT FILM PHA	31	3	5-7	1	5
	LEAM	DJ-14	FRONT FILM ACCUMULATOR	31	3	8-10	1	5
	LEAM	DJ-15	REAR FILM ID	39	3	1-4	1	6
	LEAM	DJ-16	REAR FILM PHA	39	3	5-7	1	6
	LEAM	DJ-17	REAR FILM ACCUMULATOR	39	3	8-10	1	6
	LEAM	DJ-18	FRONT COLLECTOR ID	31	4	1-4	1	7
	LEAM	DJ-19	MICROPHONE PHA	31	4	5-7	1	7
	LEAM	DJ-20	MICROPHONE ACCUMULATOR	31	4	8-10	1	7
	LEAM	DJ-21	REAR COLLECTOR ID	39	4	1-4	1	8
	LEAM	DJ-22	ELAPSED TIME	39	4	5-10	1	8
	LEAM	DJ-23	FILM ID	31	5	1-2	1	9
	LEAM	DJ-24	COLLECTOR ID	31	5	3-4	1	9
	LEAM	DJ-25	FILM PHA	31	5	5-7	1	9
	LEAM	DJ-26	FILM ACCUMULATOR	31	5	8-10	1	9
	LEAM	DJ-27	SECONDARY MICROPHONE ACCUM.	39	5	1-2	1	10
	LEAM	DJ-28	ANALOG DATA SYNC ID BIT	39	5	3	1	10
	LEAM	DJ-29	HEATER STATUS	39	5	4	1	10
	LEAM	DJ-30	MAIN MICROPHONE PHA	39	5	5-7	1	10
	LEAM	DJ-31	MAIN MICROPHONE ACCUMULATOR	39	5	8-10	1	10

(1) The sequence established in ALSEP frames 1-5 is repeated 18 times during each set of ALSEP 90 main frames.

1.5.1.5 HEAT FLOW EXPERIMENT (HFE)

1.5.1.5.1 HFE DOWNLINK DESCRIPTION

The HFE is allotted word 23 in the ALSEP main frame. The HFE uses ALSEP frames 0-15 to transmit data. Frames 16-89 contain fill zeros in word 23.

There are three HFE modes: G, LK, HK. All transmit data in the same basic format. Mode G is referred to as mode 1; mode LK as mode 2; mode HK as mode 3. Modes 1 and 2 read out identical data with the exception that in mode 2, the interpretation of the data also depends on the status (ON or OFF) of the HFE probe heaters. Mode 3 reads out a different set of measurements than modes 1 and 2.

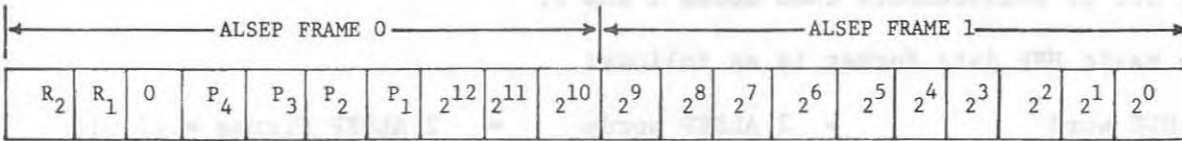
The basic HFE data format is as follows:

1 HFE word	=	2 ALSEP words	=	2 ALSEP frames	=	20 bits
4 HFE words	=	1 HFE data point	=	8 ALSEP frames		
		2 HFE data points	=	90 ALSEP frames		
1 normal HFE data cycle	=	16 HFE data points	=	720 ALSEP frames		

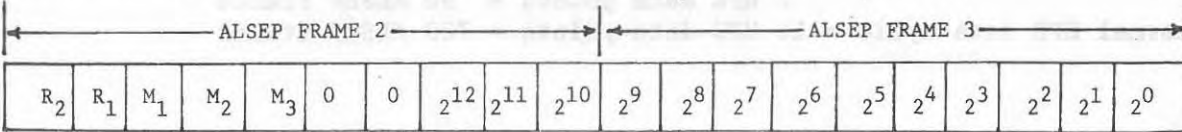
HFE DATA POINT

Bit Positions																			
1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10

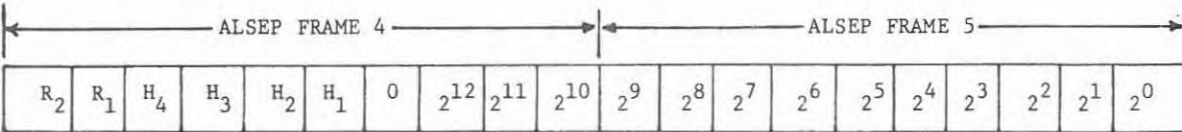
Heat Flow Word 0



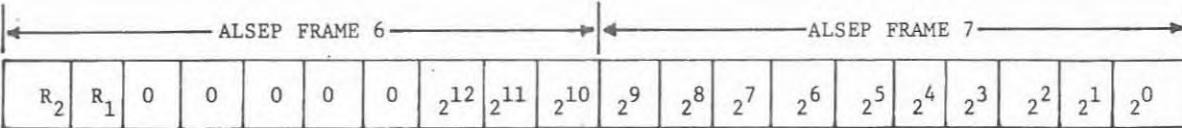
Heat Flow Word 1



Heat Flow Word 2



Heat Flow Word 3



M_1, M_2, M_3 : mode registers, (100) Gradient Mode, (010) Low Conductivity Mode, and (001) High Conductivity Mode, respectively.

P_4, P_3, P_2, P_1 : measurement identification

R_2, R_1 : binary equivalent of Heat Flow Word.

H_4, H_3, H_2, H_1 : conductivity heater registers (8 heaters)

Note: ALSEP frames 8 through 15 contain a HFE data point with a format identical to the one shown above.

In modes 1, 2, and 3 most of the measurement numbers refer to four 20-bit HFE words. These HFE words carry tag bits which completely identify the data (13 bits) in that word. In this document, the four associated HFE words are given measurement numbers of the form DH-nnA, DH-nnB, DH-nnC, DH-nnD, and are put in the parameter lists with their tag bits. There are certain measurement numbers which refer only to one 20-bit HFE word. These measurements are the HFE Thermocouple groups. The measurement numbers of the two groups are: DH-14, DH-34, DH-44 and DH-16, DH-26, DH-36, DH-46.

The HFE also contains a special group of measurements which are referred to as "tag bits" in the HFE parameter listing. They are;

- DH-90 -- Three mode bits, M1, M2, M3. 100 = mode 1, 010 = mode 2, 001 = mode 3.
- DH-91 -- Four measurement number identification bits. P4, P3, P2, P1. In mode 3, P1 in conjunction with DH-93, identifies measurement number.
- DH-92 -- Two bits, R2 and R1, which equal the binary equivalent of the HFE word.
- DH-93 -- Four heater register bits, H4, H3, H2, H1. In conjunction with DH-91, bit P1, DH-93 identifies the measurement number in HFE mode 3.

The normal HFE data cycle for modes 1 and 2 is shown in the parameter list in part 2 of this section. There are fourteen other configurations that the data can assume. The measurements in the cycle and the length of the cycle are given below.

- Normal HFE data cycle is read out. Data cycle = 720 ALSEP frames.
- DH-1, DH-2, DH-3, DH-4 are read out. Data cycle = 180 ALSEP frames.
- DH-5, DH-6, DH-7, DH-8 are read out. Data cycle = 180 ALSEP frames.
- DH-9, DH-10, DH-11, DH-12 are read out. Data cycle = 180 ALSEP frames.
- DH-13, DH-14, DH-24, DH-34, DH-44, DH-15, DH-16, DH-26, DH-36, DH-46 are read out. Data cycle = 180 frames.
- DH-1, DH-2, DH-5, DH-6, DH-9, DH-10, DH-13, DH-14, DH-24, DH-34, DH-44 are read out. Data cycle = 360 ALSEP frames.
- DH-1, DH-2 are read out. Data cycle = 90 ALSEP frames.
- DH-5, DH-6 are read out. Data cycle = 90 ALSEP frames.
- DH-9, DH-10 are read out. Data cycle = 90 ALSEP frames.
- DH-13, DH-14, DH-24, DH-34, DH-44 are read out. Data cycle = 90 ALSEP frames.
- DH-3, DH-4, DH-7, DH-8, DH-11, DH-12, DH-15, DH-16, DH-26, DH-36, DH-46 are read out. Data cycle = 360 ALSEP frames.
- DH-3, DH-4 are read out. Data cycle = 90 ALSEP frames.
- DH-7, DH-8 are read out. Data cycle = 90 ALSEP frames.
- DH-11, DH-12 are read out. Data cycle = 90 ALSEP frames.
- DH-15, DH-16, DH-26, DH-36, DH-46 are read out. Data cycle = 90 ALSEP frames.

1.5.1.5.2 HFE PARAMETER LISTING

DOWNLINK LISTINGS COLUMN HEADERS

- Col. 1 Experiment name.
- Col. 2 Measurement number. A suffix of A, B, C, or D has been added to differentiate some measurement numbers. See tag bits.
- Col. 3 Measurement name.
- Col. 4 ALSEP main frame (1-64) word. An asterisk in this column indicates that experiment's words are asynchronous with respect to the ALSEP main frame word.
- Col. 5 ALSEP frame. The ALSEP frame number as read from the ALSEP frame counter in ALSEP word 3. The ALSEP frame counter counts from 1-89, and then to 0, which represents 90. Columns 45-51 may contain one of the following words:
- ALL = All ALSEP main frames
EVN = Even numbered ALSEP main frames
ODD = Odd numbered ALSEP main frames.
- An asterisk in this column indicates that this parameter is asynchronous with respect to the ALSEP frame.
- Col. 6 Bits. Indicates which of the ten or twenty bits of an ALSEP (1-10) or experiment (1-20) word contain the measurement number given in column 2.
- Col. 7 Samples per Main Frame (S/MF). Indicates how often (on the average) a parameter appears in the ALSEP main frame.
- Col. 8 Experiment word. For the HFE this column indicates the HFE word number (0-3).
- Col. 9 P_4, P_3, P_2, P_1 - For HFE Modes 1&2 this value indicates measurement identification. For Mode 3 P_1 is used with H_4, H_3, H_2, H_1 measurement identification.
- Col. 10 R_2, R_1 . The binary equivalent of Heat Flow Word.
- Col. 11 H_4, H_3, H_2, H_1 . For HFE Mode 3 this value indicates measurement identification.

HFE MODES 1 AND 2

REV.	EXP. NAME	MEAS. NO.	MEASUREMENT NAME	ALSEP		BIT	S/MF	HFE WD	PPPP 4321	RR 21	HHHH 4321
				WD	FRAMES						
HFE	DH-1A	ΔT11H	TEMP GRAD HIGH SENS	23	0-1	13	1/720	0	0000	00	
HFE	DH-1B	ΔT11H	TEMP GRAD HIGH SENS	23	2-3	13	1/720	1	0000	01	
HFE	DH-1C	ΔT11H	TEMP GRAD HIGH SENS	23	4-5	13	1/720	2	0000	10	
HFE	DH-1D	ΔT11H	TEMP GRAD HIGH SENS	23	6-7	13	1/720	3	0000	11	
HFE	DH-2A	ΔT12H	TEMP GRAD HIGH SENS	23	8-9	13	1/720	0	0001	00	
HFE	DH-2B	ΔT12H	TEMP GRAD HIGH SENS	23	10-11	13	1/720	1	0001	01	
HFE	DH-2C	ΔT12H	TEMP GRAD HIGH SENS	23	12-13	13	1/720	2	0001	10	
HFE	DH-2D	ΔT12H	TEMP GRAD HIGH SENS	23	14-15	13	1/720	3	0001	11	
HFE	DH-3A	ΔT21H	TEMP GRAD HIGH SENS	23	90-91	13	1/720	0	0010	00	
HFE	DH-3B	ΔT21H	TEMP GRAD HIGH SENS	23	92-93	13	1/720	1	0010	01	
HFE	DH-3C	ΔT21H	TEMP GRAD HIGH SENS	23	94-95	13	1/720	2	0010	10	
HFE	DH-3D	ΔT21H	TEMP GRAD HIGH SENS	23	96-97	13	1/720	3	0010	11	
HFE	DH-4A	ΔT22H	TEMP GRAD HIGH SENS	23	98-99	13	1/720	0	0011	00	
HFE	DH-4B	ΔT22H	TEMP GRAD HIGH SENS	23	100-101	13	1/720	1	0011	01	
HFE	DH-4C	ΔT22H	TEMP GRAD HIGH SENS	23	102-103	13	1/720	2	0011	10	
HFE	DH-4D	ΔT22H	TEMP GRAD HIGH SENS	23	104-105	13	1/720	3	0011	11	
HFE	DH-5A	ΔT11L	TEMP GRAD LOW SENS	23	180-181	13	1/720	0	0100	00	
HFE	DH-5B	ΔT11L	TEMP GRAD LOW SENS	23	182-183	13	1/720	1	0100	01	
HFE	DH-5C	ΔT11L	TEMP GRAD LOW SENS	23	184-185	13	1/720	2	0100	10	
HFE	DH-5D	ΔT11L	TEMP GRAD LOW SENS	23	186-187	13	1/720	3	0100	11	
HFE	DH-6A	ΔT12L	TEMP GRAD LOW SENS	23	188-189	13	1/720	0	0101	00	
HFE	DH-6B	ΔT12L	TEMP GRAD LOW SENS	23	190-191	13	1/720	1	0101	01	
HFE	DH-6C	ΔT12L	TEMP GRAD LOW SENS	23	192-193	13	1/720	2	0101	10	
HFE	DH-6D	ΔT12L	TEMP GRAD LOW SENS	23	194-195	13	1/720	3	0101	11	
HFE	DH-7A	ΔT21L	TEMP GRAD LOW SENS	23	270-271	13	1/720	0	0110	00	
HFE	DH-7B	ΔT21L	TEMP GRAD LOW SENS	23	272-273	13	1/720	1	0110	01	
HFE	DH-7C	ΔT21L	TEMP GRAD LOW SENS	23	274-275	13	1/720	2	0110	10	
HFE	DH-7D	ΔT21L	TEMP GRAD LOW SENS	23	276-277	13	1/720	3	0110	11	
HFE	DH-8A	ΔT22L	TEMP GRAD LOW SENS	23	278-279	13	1/720	0	0111	00	
HFE	DH-8B	ΔT22L	TEMP GRAD LOW SENS	23	280-281	13	1/720	1	0111	01	
HFE	DH-8C	ΔT22L	TEMP GRAD LOW SENS	23	282-283	13	1/720	2	0111	10	
HFE	DH-8D	ΔT22L	TEMP GRAD LOW SENS	23	284-285	13	1/720	3	0111	11	
HFE	DH-9A	T11	PROBE AMBIENT TEMP	23	360-361	13	1/720	0	1000	00	
HFE	DH-9B	T11	PROBE AMBIENT TEMP	23	362-363	13	1/720	1	1000	01	
HFE	DH-9C	T11	PROBE AMBIENT TEMP	23	364-365	13	1/720	2	1000	10	
HFE	DH-9D	T11	PROBE AMBIENT TEMP	23	366-367	13	1/720	3	1000	11	
HFE	DH-10A	T12	PROBE AMBIENT TEMP	23	368-369	13	1/720	0	1001	00	
HFE	DH-10B	T12	PROBE AMBIENT TEMP	23	370-371	13	1/720	1	1001	01	
HFE	DH-10C	T12	PROBE AMBIENT TEMP	23	372-373	13	1/720	2	1001	10	
HFE	DH-10D	T12	PROBE AMBIENT TEMP	23	374-375	13	1/720	3	1001	11	
HFE	DH-11A	T21	PROBE AMBIENT TEMP	23	450-451	13	1/720	0	1010	00	

HFE MODES 1 AND 2 (CONT'D)

REV.	EXP.	MEAS.	MEASUREMENT NAME	ALSEP	HFE	PPPP	RR	HHHH
NAME	NO.			WD FRAMES BIT S/MF	WD	4321	21	4321
HFE	DH-11B	T21	PROBE AMBIENT TEMP	23 452-453 13 1/720	1	1010	01	
HFE	DH-11C	T21	PROBE AMBIENT TEMP	23 454-455 13 1/720	2	1010	10	
HFE	DH-11D	T21	PROBE AMBIENT TEMP	23 456-457 13 1/720	3	1010	11	
HFE	DH-12A	T22	PROBE AMBIENT TEMP	23 458-459 13 1/720	0	1011	00	
HFE	DH-12B	T22	PROBE AMBIENT TEMP	23 460-461 13 1/720	1	1011	01	
HFE	DH-12C	T22	PROBE AMBIENT TEMP	23 462-463 13 1/720	2	1011	10	
HFE	DH-12D	T22	PROBE AMBIENT TEMP	23 464-465 13 1/720	3	1011	11	
HFE	DH-13A	REF T1	TEMP REF JUNCTION	23 540-541 13 1/720	0	1100	00	
HFE	DH-13B	REF T1	TEMP REF JUNCTION	23 542-543 13 1/720	1	1100	01	
HFE	DH-13C	REF T1	TEMP REF JUNCTION	23 544-545 13 1/720	2	1100	10	
HFE	DH-13D	REF T1	TEMP REF JUNCTION	23 546-547 13 1/720	3	1100	11	
HFE	DH-14	TC1	GROUP PROBE CABLE TEMP	23 548-549 13 1/720	0	1101	00	
HFE	DH-24	TC1	GROUP PROBE CABLE TEMP	23 550-551 13 1/720	1	1101	01	
HFE	DH-34	TC1	GROUP PROBE CABLE TEMP	23 552-553 13 1/720	2	1101	10	
HFE	DH-44	TC1	GROUP PROBE CABLE TEMP	23 554-555 13 1/720	3	1101	11	
HFE	DH-15A	REF T2	TEMP REF JUNCTION	23 630-631 13 1/720	0	1110	00	
HFE	DH-15B	REF T2	TEMP REF JUNCTION	23 632-633 13 1/720	1	1110	01	
HFE	DH-15C	REF T2	TEMP REF JUNCTION	23 634-635 13 1/720	2	1110	10	
HFE	DH-15D	REF T2	TEMP REF JUNCTION	23 636-637 13 1/720	3	1110	11	
HFE	DH-16	TC2	GROUP PROBE CABLE TEMP	23 638-639 13 1/720	0	1111	00	
HFE	DH-26	TC2	GROUP PROBE CABLE TEMP	23 640-641 13 1/720	1	1111	01	
HFE	DH-36	TC2	GROUP PROBE CABLE TEMP	23 642-643 13 1/720	2	1111	10	
HFE	DH-46	TC2	GROUP PROBE CABLE TEMP	23 644-645 13 1/720	3	1111	11	

HFE MODE 3

HFE	DH-50A	DIFF TEMP	HTR OFF	23 0-1 13 1/720	0	0	00	0000
HFE	DH-50B	DIFF TEMP	HTR OFF	23 2-3 13 1/720	1	0	01	0000
HFE	DH-50C	DIFF TEMP	HTR OFF	23 4-5 13 1/720	2	0	10	0000
HFE	DH-50D	DIFF TEMP	HTR OFF	23 6-7 13 1/720	3	0	11	0000
HFE	DH-51A	AMB TEMP	HTR OFF	23 8-9 13 1/720	0	1	00	0000
HFE	DH-51B	AMB TEMP	HTR OFF	23 10-11 13 1/720	1	1	01	0000
HFE	DH-51C	AMB TEMP	HTR OFF	23 12-13 13 1/720	2	1	10	0000
HFE	DH-51D	AMB TEMP	HTR OFF	23 14-15 13 1/720	3	1	11	0000
HFE	DH-52A	DIFF TEMP	HTR 12 ON	23 0-1 13 1/720	0	0	00	0001
HFE	DH-52B	DIFF TEMP	HTR 12 ON	23 2-3 13 1/720	1	0	01	0001
HFE	DH-52C	DIFF TEMP	HTR 12 ON	23 4-5 13 1/720	2	0	10	0001
HFE	DH-52D	DIFF TEMP	HTR 12 ON	23 6-7 13 1/720	3	0	11	0001
HFE	DH-53A	AMB TEMP	HTR 12 ON	23 8-9 13 1/720	0	1	00	0001
HFE	DH-53B	AMB TEMP	HTR 12 ON	23 10-11 13 1/720	1	1	01	0001

HFE MODE 3 (CONT'D)

REV.	EXP.	MEAS.	MEASUREMENT NAME	ALSEP				HFE	PPPP	RR	HHHH
				WD	FRAMES	BIT	S/MF				
								WD	4321	21	4321
HFE	DH-53C	AMB TEMP HTR 12 ON		23	12-13	13	1/720	2	1	10	0001
HFE	DH-53D	AMB TEMP HTR 12 ON		23	14-15	13	1/720	3	1	11	0001
HFE	DH-60A	DIFF TEMP HTR OFF		23	0-1	13	1/720	0	0	00	0010
HFE	DH-60B	DIFF TEMP HTR OFF		23	2-3	13	1/720	1	0	01	0010
HFE	DH-60C	DIFF TEMP HTR OFF		23	4-5	13	1/720	2	0	10	0010
HFE	DH-60D	DIFF TEMP HTR OFF		23	6-7	13	1/720	3	0	11	0010
HFE	DH-61A	AMP TEMP HTR OFF		23	8-9	13	1/720	0	1	00	0010
HFE	DH-61B	AMP TEMP HTR OFF		23	10-11	13	1/720	1	1	01	0010
HFE	DH-61C	AMP TEMP HTR OFF		23	12-13	13	1/720	2	1	10	0010
HFE	DH-61D	AMP TEMP HTR OFF		23	14-15	13	1/720	3	1	11	0010
HFE	DH-62A	DIFF TEMP HTR 14 ON		23	0-1	13	1/720	0	0	00	0011
HFE	DH-62B	DIFF TEMP HTR 14 ON		23	2-3	13	1/720	1	0	01	0011
HFE	DH-62C	DIFF TEMP HTR 14 ON		23	4-5	13	1/720	2	0	10	0011
HFE	DH-62D	DIFF TEMP HTR 14 ON		23	6-7	13	1/720	3	0	11	0011
HFE	DH-63A	AMB TEMP HTR 14 ON		23	8-9	13	1/720	0	1	00	0011
HFE	DH-63B	AMB TEMP HTR 14 ON		23	10-11	13	1/720	1	1	01	0011
HFE	DH-63C	AMB TEMP HTR 14 ON		23	12-13	13	1/720	2	1	10	0011
HFE	DH-63D	AMB TEMP HTR 14 ON		23	14-15	13	1/720	3	1	11	0011
HFE	DH-56A	DIFF TEMP HTR OFF		23	0-1	13	1/720	0	0	00	0100
HFE	DH-56B	DIFF TEMP HTR OFF		23	2-3	13	1/720	1	0	01	0100
HFE	DH-56C	DIFF TEMP HTR OFF		23	4-5	13	1/720	2	0	10	0100
HFE	DH-56D	DIFF TEMP HTR OFF		23	6-7	13	1/720	3	0	11	0100
HFE	DH-57A	AMB TEMP HTR OFF		23	8-9	13	1/720	0	1	00	0100
HFE	DH-57B	AMB TEMP HTR OFF		23	10-11	13	1/720	1	1	01	0100
HFE	DH-57C	AMB TEMP HTR OFF		23	12-13	13	1/720	2	1	10	0100
HFE	DH-57D	AMB TEMP HTR OFF		23	14-15	13	1/720	3	1	11	0100
HFE	DH-58A	DIFF TEMP HTR 11 ON		23	0-1	13	1/720	0	0	00	0101
HFE	DH-58B	DIFF TEMP HTR 11 ON		23	2-3	13	1/720	1	0	01	0101
HFE	DH-58C	DIFF TEMP HTR 11 ON		23	4-5	13	1/720	2	0	10	0101
HFE	DH-58D	DIFF TEMP HTR 11 ON		23	6-7	13	1/720	3	0	11	0101
HFE	DH-59A	AMB TEMP HTR 11 ON		23	8-9	13	1/720	0	1	00	0101
HFE	DH-59B	AMB TEMP HTR 11 ON		23	10-11	13	1/720	1	1	01	0101
HFE	DH-59C	AMB TEMP HTR 11 ON		23	12-13	13	1/720	2	1	10	0101
HFE	DH-59D	AMB TEMP HTR 11 ON		23	14-15	13	1/720	3	1	11	0101
HFE	DH-66A	DIFF TEMP HTR OFF		23	0-1	13	1/720	0	0	00	0110
HFE	DH-66B	DIFF TEMP HTR OFF		23	2-3	13	1/720	1	0	01	0110
HFE	DH-66C	DIFF TEMP HTR OFF		23	4-5	13	1/720	2	0	10	0110
HFE	DH-66D	DIFF TEMP HTR OFF		23	6-7	13	1/720	3	0	11	0110
HFE	DH-67A	AMB TEMP HTR OFF		23	8-9	13	1/720	0	1	00	0110
HFE	DH-67B	AMB TEMP HTR OFF		23	10-11	13	1/720	1	1	01	0110

HFE MODE 3 (CONT'D)

REV.	EXP.	MEAS.	MEASUREMENT NAME	ALSEP		BIT	S/MF	HFE	PPPP	RR	HHH
				WD	FRAMES			WD	4321	21	4321
HFE	DH-67C	AMB TEMP	HTR OFF	23	12-13	13	1/720	2	1	10	0110
HFE	DH-67D	AMB TEMP	HTR OFF	23	14-15	13	1/720	3	1	11	0110
HFE	DH-68A	DIFF TEMP	HTR 13 ON	23	0-1	13	1/720	0	0	00	0111
HFE	DH-68B	DIFF TEMP	HTR 13 ON	23	2-3	13	1/720	1	0	01	0111
HFE	DH-68C	DIFF TEMP	HTR 13 ON	23	4-5	13	1/720	2	0	10	0111
HFE	DH-68D	DIFF TEMP	HTR 13 ON	23	6-7	13	1/720	3	0	11	0111
HFE	DH-69A	AMB TEMP	HTR 13 ON	23	8-9	13	1/720	0	1	00	0111
HFE	DH-69B	AMB TEMP	HTR 13 ON	23	10-11	13	1/720	1	1	01	0111
HFE	DH-69C	AMB TEMP	HTR 13 ON	23	12-13	13	1/720	2	1	10	0111
HFE	DH-69D	AMB TEMP	HTR 13 ON	23	14-15	13	1/720	3	1	11	0111
HFE	DH-70A	DIFF TEMP	HTR OFF	23	0-1	13	1/720	0	0	00	1000
HFE	DH-70B	DIFF TEMP	HTR OFF	23	2-3	13	1/720	1	0	01	1000
HFE	DH-70C	DIFF TEMP	HTR OFF	23	4-5	13	1/720	2	0	10	1000
HFE	DH-70D	DIFF TEMP	HTR OFF	23	6-7	13	1/720	3	0	11	1000
HFE	DH-71A	AMB TEMP	HTR OFF	23	8-9	13	1/720	0	1	00	1000
HFE	DH-71B	AMB TEMP	HTR OFF	23	10-11	13	1/720	1	1	01	1000
HFE	DH-71C	AMB TEMP	HTR OFF	23	12-13	13	1/720	2	1	10	1000
HFE	DH-71D	AMB TEMP	HTR OFF	23	14-15	13	1/720	3	1	11	1000
HFE	DH-72A	DIFF TEMP	HTR 22 ON	23	0-1	13	1/720	0	0	00	1001
HFE	DH-72B	DIFF TEMP	HTR 22 ON	23	2-3	13	1/720	1	0	01	1001
HFE	DH-72C	DIFF TEMP	HTR 22 ON	23	4-5	13	1/720	2	0	10	1001
HFE	DH-72D	DIFF TEMP	HTR 22 ON	23	6-7	13	1/720	3	0	11	1001
HFE	DH-73A	AMB TEMP	HTR 22 ON	23	8-9	13	1/720	0	1	00	1001
HFE	DH-73B	AMB TEMP	HTR 22 ON	23	10-11	13	1/720	1	1	01	1001
HFE	DH-73C	AMB TEMP	HTR 22 ON	23	12-13	13	1/720	2	1	10	1001
HFE	DH-73D	AMB TEMP	HTR 22 ON	23	14-15	13	1/720	3	1	11	1001
HFE	DH-80A	DIFF TEMP	HTR OFF	23	0-1	13	1/720	0	0	00	1010
HFE	DH-80B	DIFF TEMP	HTR OFF	23	2-3	13	1/720	1	0	01	1010
HFE	DH-80C	DIFF TEMP	HTR OFF	23	4-5	13	1/720	2	0	10	1010
HFE	DH-80D	DIFF TEMP	HTR OFF	23	6-7	13	1/720	3	0	11	1010
HFE	DH-81A	AMB TEMP	HTR OFF	23	8-9	13	1/720	0	1	00	1010
HFE	DH-81B	AMB TEMP	HTR OFF	23	10-11	13	1/720	1	1	01	1010
HFE	DH-81C	AMB TEMP	HTR OFF	23	12-13	13	1/720	2	1	10	1010
HFE	DH-81D	AMB TEMP	HTR OFF	23	14-15	13	1/720	3	1	11	1010
HFE	DH-82A	DIFF TEMP	HTR 24 ON	23	0-1	13	1/720	0	0	00	1011
HFE	DH-82B	DIFF TEMP	HTR 24 ON	23	2-3	13	1/720	1	0	01	1011
HFE	DH-82C	DIFF TEMP	HTR 24 ON	23	4-5	13	1/720	2	0	10	1011
HFE	DH-82D	DIFF TEMP	HTR 24 ON	23	6-7	13	1/720	3	0	11	1011
HFE	DH-83A	AMB TEMP	HTR 24 ON	23	8-9	13	1/720	0	1	00	1011
HFE	DH-83B	AMB TEMP	HTR 24 ON	23	10-11	13	1/720	1	1	01	1011
HFE	DH-83C	AMB TEMP	HTR 24 ON	23	12-13	13	1/720	2	1	10	1011

HFE MODE 3 (CONT'D)

REV.	EXP.	MEAS.	MEASUREMENT NAME	ALSEP				HFE	PPPP	RR	HHHH
				WD	FRAMES	BIT	S/MF				
HFE		DH-83D	AMB TEMP HTR 24 ON	23	14-15	13	1/720	3	1	11	1011
HFE		DH-76A	DIFF TEMP HTR OFF	23	0-1	13	1/720	0	0	00	1100
HFE		DH-76B	DIFF TEMP HTR OFF	23	2-3	13	1/720	1	0	01	1100
HFE		DH-76C	DIFF TEMP HTR OFF	23	4-5	13	1/720	2	0	10	1100
HFE		DH-76D	DIFF TEMP HTR OFF	23	6-7	13	1/720	3	0	11	1100
HFE		DH-77A	AMB TEMP HTR OFF	23	8-9	13	1/720	0	1	00	1100
HFE		DH-77B	AMB TEMP HTR OFF	23	10-11	13	1/720	1	1	01	1100
HFE		DH-77C	AMB TEMP HTR OFF	23	12-13	13	1/720	2	1	10	1100
HFE		DH-77D	AMB TEMP HTR OFF	23	14-15	13	1/720	3	1	11	1100
HFE		DH-78A	DIFF TEMP HTR 21 ON	23	0-1	13	1/720	0	0	00	1101
HFE		DH-78B	DIFF TEMP HTR 21 ON	23	2-3	13	1/720	1	0	01	1101
HFE		DH-78C	DIFF TEMP HTR 21 ON	23	4-5	13	1/720	2	0	10	1101
HFE		DH-78D	DIFF TEMP HTR 21 ON	23	6-7	13	1/720	3	0	11	1101
HFE		DH-79A	AMB TEMP HTR 21 ON	23	8-9	13	1/720	0	1	00	1101
HFE		DH-79B	AMB TEMP HTR 21 ON	23	10-11	13	1/720	1	1	01	1101
HFE		DH-79C	AMB TEMP HTR 21 ON	23	12-13	13	1/720	2	1	10	1101
HFE		DH-79D	AMB TEMP HTR 21 ON	23	14-15	13	1/720	3	1	11	1101
HFE		DH-86A	DIFF TEMP HTR OFF	23	0-1	13	1/720	0	0	00	1110
HFE		DH-86B	DIFF TEMP HTR OFF	23	2-3	13	1/720	1	0	01	1110
HFE		DH-86C	DIFF TEMP HTR OFF	23	4-5	13	1/720	2	0	10	1110
HFE		DH-86D	DIFF TEMP HTR OFF	23	6-7	13	1/720	3	0	11	1110
HFE		DH-87A	AMB TEMP HTR OFF	23	8-9	13	1/720	0	1	00	1110
HFE		DH-87B	AMB TEMP HTR OFF	23	10-11	13	1/720	1	1	01	1110
HFE		DH-87C	AMB TEMP HTR OFF	23	12-13	13	1/720	2	1	10	1110
HFE		DH-87D	AMB TEMP HTR OFF	23	14-15	13	1/720	3	1	11	1110
HFE		DH-88A	DIFF TEMP HTR 23 ON	23	0-1	13	1/720	0	0	00	1111
HFE		DH-88B	DIFF TEMP HTR 23 ON	23	2-3	13	1/720	1	0	01	1111
HFE		DH-88C	DIFF TEMP HTR 23 ON	23	4-5	13	1/720	2	0	10	1111
HFE		DH-88D	DIFF TEMP HTR 23 ON	23	6-7	13	1/720	3	0	11	1111
HFE		DH-89A	AMB TEMP HTR 23 ON	23	8-9	13	1/720	0	1	00	1111
HFE		DH-89B	AMB TEMP HTR 23 ON	23	10-11	13	1/720	1	1	01	1111
HFE		DH-89C	AMB TEMP HTR 23 ON	23	12-13	13	1/720	2	1	10	1111
HFE		DH-89D	AMB TEMP HTR 23 ON	23	14-15	13	1/720	3	1	11	1111

1.5.1.6 LUNAR SURFACE GRAVIMETER

1.5.1.6.1 LSG DOWNLINK DESCRIPTION

Scientific Measurements

Six LSG scientific parameters are output in 36 ALSEP main frame words. The LSG output words are each 10 bits in length.

Two operating modes are available with the LSG: normal scientific data mode, and shaft encoder mode.

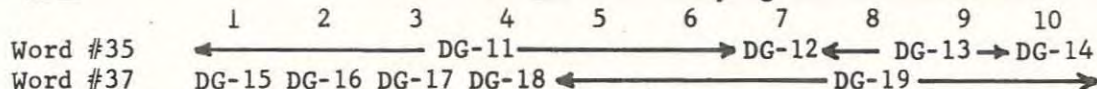
The normal scientific mode contains 31 samples of seismic data, 1 sample of tidal data and two status and two housekeeping words per ALSEP main frame. The scientific measurements are output as follows:

Measurement Number	Measurement Name	Samples Per Second
DG-01	Seismic	51.4
DG-02	Tide	1.66
DG-03	Free Mode	1.66
DG-04	Sensor Temperature	1.66

The bit settings used for the scientific measurements are as follows:

Data Value	MSB	2	3	4	5	6	7	8	9	LSB
+511	0	0	0	0	0	0	0	0	0	0
+510	0	0	0	0	0	0	0	0	0	1
⋮					⋮					
+1	0	1	1	1	1	1	1	1	1	0
0	0	1	1	1	1	1	1	1	1	1
-1	1	0	0	0	0	0	0	0	0	0
⋮					⋮					
-511	1	1	1	1	1	1	1	1	1	0
-512	1	1	1	1	1	1	1	1	1	1

ALSEP words 35 and 37 contain the LSG housekeeping status measurements as follows:



The format for the two housekeeping status words is as follows:

Meas. No.	Meas. Bit No.	ALSEP Word Bit No.	ALSEP Word 35 Description	LSG Exp. Operate Status Bit Definition
DG-11	1	1	Temperature Relay #1	1 = Selected 0 = Not Selected
DG-11	2	2	Temperature Relay #2	1 = Selected 0 = Not Selected
DG-11	3	3	Temperature Relay #3	1 = Selected 0 = Not Selected
DG-11	4	4	Temperature Relay #4	1 = Selected 0 = Not Selected
DG-11	5	5	Temperature Relay #5	1 = Selected 0 = Not Selected
DG-11	6	6	Temperature Relay #6	1 = Selected 0 = Not Selected
DG-12		7	Mass Change Motor	1 = On 0 = Off
DG-13	1	8	Coarse/Fine Screw Servo Motor	1 = On 0 = Off
DG-13	2	9	Coarse/Fine Screw Servo Motor Slewing*	1 = Slewing 0 = Not Slewing
DG-14		10	Tilt Servo Motor	1 = On 0 = Off

* When bit 8 is a 0, bit 9 is indeterminate.

Meas. No.	Meas. Bit No.	ALSEP Word Bit No.	ALSEP Word 37 Description	LSG CMD Register Status Bit Definition
DG-15		1	Command Decoder Power	1 = On 0 = Off
DG-16		2	Instrument Housing Heater Power	1 = On 0 = Off
DG-17		3	Pressure Transducer Monitor	1 = On 0 = Off
DG-18		4	Seismic High Gain Mode	1 = High 0 = Low
DG-19	1	5	Command Counter, Bit 2^5	40 to 77 octal count
DG-19	2	6	Command Counter, Bit 2^4 *	
DG-19	3	7	Command Counter, Bit 2^3	
DG-19	4	8	Command Counter, Bit 2^2	
DG-19	5	9	Command Counter, Bit 2^1	
DG-19	6	10	Command Counter, Bit 2^0	

* When the LSG Command Decoder is powered off (bit 1=0), the five command counter bits (bits 6-10) are all ones.

Command functions indicated by Command Counter are as follows:

<u>Octal Count</u>	<u>Function</u>
40	Counter Clear
41	Read Shaft Encoder
42	Mass Change Motor ON
43	Bias In
44	Bias Out
45	Integrator, Normal Mode
46	Integrator, Short Mode
47	Seismic Low Gain
50	Seismic High Gain
51	Sensor Beam Caged
52	Sensor Beam Uncaged
53	Coarse Screw Servo ON
54	Tilt, Mass Change, Screw Servos and Press. Trans. OFF
55	Pressure Transducer ON
56	Mass Change Increment
57	Gross Slew Up/Tilt Increment Up
60	Gross Slew Down/Tilt Increment Down
61	Vernier Slew Up
62	Vernier Slew Down
63	Fine Screw Servo ON
64	North/South Tilt Servo ON
65	East/West Tilt Servo ON
66	Temperature Relay #1
67	Temperature Relay #2
70	Temperature Relay #3
71	Temperature Realy #4
72	Temperature Relay #5
73	Temperature Relay #6
74	Temperature Reset
75	Post Amp. Gain Increment
76	Post Amp. Gain Reset
77	Unassigned

The LSG, upon command from the ground to shaft encoder mode, will register the value 00001 in the command counter bits (bits 6-10 of ALSEP word 37). After command execute and completion of the next ALSEP frame 90, LSG words in the main frame will contain the coarse encoder and fine encoder bit values. Encoder data will be output for 90 main frames and will automatically reset to the normal scientific data made at the completion of frame 90. The format for the encoder data is as follows:

Meas. No.	ALSEP Bits									
	MSB	2	3	4	5	6	7	8	9	LSB
DG-7	1*	MSB 2^{18}	2^{17}	2^{16}	2^{15}	2^{14}	2^{13}	2^{12}	2^{11}	2^{10}
DG-8	2^9	2^8	2^7	2^6	2^5	2^4	2^3	2^2	2^1	LSB 2^0
DG-9	1*	MSB 2^{18}	2^{17}	2^{16}	2^{15}	2^{14}	2^{13}	2^{12}	2^{11}	2^{10}
DG-10	2^9	2^8	2^7	2^6	2^5	2^4	2^3	2^2	2^1	LSB 2^0

* The MSB of DG-7 and DG-9 (bit 1) will be spare and set to 1.

DG-7 and DG-8 contain the Coarse Encoder data with the most significant syllable in DG-7.

DG-9 and DG-10 contain the Fine Encoder data with the most significant syllable in DG-9.

1.5.1.6.2 LSG PARAMETER LISTING

DOWNLINK LISTINGS COLUMN HEADERS

- Col. 1 Experiment name.
- Col. 2 Measurement number. (An asterisk indicates that the word is subcommanded)
- Col. 3 Measurement name.
- Col. 4 ALSEP main frame (1-64) word. An asterisk in this column indicates that experiment's words are asynchronous with respect to the ALSEP main frame word.
- Col. 5 ALSEP frame. The ALSEP frame number as read from the ALSEP frame counter in ALSEP word 3. The ALSEP frame counter counts from 1-89, and then to 0, which represents 90. Columns 46-48 may contain one of the following words:
- ALL = All ALSEP main frames
 - EVN = Even numbered ALSEP main frames
 - ODD = Odd numbered ALSEP main frames.
- An asterisk in this column indicates that this parameter is asynchronous with respect to the ALSEP frame.
- Col. 6 Bits. Indicates which of the ten bits (1-10) of an ALSEP or experiment word contain the measurement number given in column 2.
- Col. 7 Samples per Main Frame (S/MF). Indicates how often (on the average) a parameter appears in the ALSEP main frame.

Normal Scientific Data Mode

REV.	EXP. NAME	MEAS. NO.	MEASUREMENT NAME	ALSEP WD	FRM	BITS	S/MF
	LSG	DG-1	SEISMIC	4	ALL	1-10	31
	LSG	DG-1	SEISMIC	6	ALL	1-10	31
	LSG	DG-1	SEISMIC	8	ALL	1-10	31
	LSG	DG-1	SEISMIC	10	ALL	1-10	31
	LSG	DG-1	SEISMIC	12	ALL	1-10	31
	LSG	DG-1	SEISMIC	14	ALL	1-10	31
	LSG	DG-1	SEISMIC	16	ALL	1-10	31
	LSG	DG-1	SEISMIC	18	ALL	1-10	31
	LSG	DG-1	SEISMIC	20	ALL	1-10	31
	LSG	DG-1	SEISMIC	22	ALL	1-10	31
	LSG	DG-1	SEISMIC	24	ALL	1-10	31
	LSG	DG-2	TIDE	25	ALL	1-10	1
	LSG	DG-1	SEISMIC	26	ALL	1-10	31
	LSG	DG-3	FREE MODE	27	ALL	1-10	1
	LSG	DG-1	SEISMIC	28	ALL	1-10	31
	LSG	DG-4	SENSOR TEMPERATURE	29	ALL	1-10	1
	LSG	DG-1	SEISMIC	30	ALL	1-10	31
	LSG	DG-1	SEISMIC	32	ALL	1-10	31
	LSG	DG-1	SEISMIC	34	ALL	1-10	31
	LSG	DG-11	TEMPERATURE RELAY STATUS	35	ALL	1-6	1
	LSG	DG-12	MASS CHANGE MOTOR STATUS	35	ALL	7	1
	LSG	DG-13	COARSE/FINE SCREW SERVO MOTOR STATUS	35	ALL	8-9	1
	LSG	DG-14	TILT SERVO MOTOR STATUS	35	ALL	10	1
	LSG	DG-1	SEISMIC	36	ALL	1-10	31
	LSG	DG-15	COMMAND DECODER POWER STATUS	37	ALL	1	1
	LSG	DG-16	INSTRUMENT HOUSING HEATER POWER STATUS	37	ALL	2	1
	LSG	DG-17	PRESSURE TRANSDUCER STATUS	37	ALL	3	1
	LSG	DG-18	SEISMIC GAIN STATUS	37	ALL	4	1
	LSG	DG-19	COMMAND COUNTER STATUS	37	ALL	5-10	1
	LSG	DG-1	SEISMIC	38	ALL	1-10	31
	LSG	DG-1	SEISMIC	40	ALL	1-10	31
	LSG	DG-1	SEISMIC	42	ALL	1-10	31
	LSG	DG-1	SEISMIC	44	ALL	1-10	31
	LSG	DG-1	SEISMIC	46	ALL	1-10	31
	LSG	DG-1	SEISMIC	48	ALL	1-10	31
	LSG	DG-1	SEISMIC	50	ALL	1-10	31
	LSG	DG-1	SEISMIC	52	ALL	1-10	31
	LSG	DG-1	SEISMIC	54	ALL	1-10	31
	LSG	DG-1	SEISMIC	56	ALL	1-10	31
	LSG	DG-1	SEISMIC	58	ALL	1-10	31
	LSG	DG-1	SEISMIC	60	ALL	1-10	31
	LSG	DG-1	SEISMIC	62	ALL	1-10	31
	LSG	DG-1	SEISMIC	64	ALL	1-10	31

Shaft Encoder Mode

REV.	EXP. NAME	MEAS. NO.	MEASUREMENT NAME	ALSEP			
				WD	FRM	BITS	S/MF
	LSG	DG-7	COARSE ENCODER MSS	4	ALL	1-10	7
	LSG	DG-8	COARSE ENCODER LSS	6	ALL	1-10	11
	LSG	DG-9	FINE ENCODER MSS	8	ALL	1-10	6
	LSG	DG-10	FINE ENCODER LSS	10	ALL	1-10	12
	LSG	DG-7	COARSE ENCODER MSS	12	ALL	1-10	7
	LSG	DG-9	COARSE ENCODER LSS	14	ALL	1-10	11
	LSG	DG-9	FINE ENCODER MSS	16	ALL	1-10	6
	LSG	DG-10	FINE ENCODER LSS	18	ALL	1-10	12
	LSG	DG-7	COARSE ENCODER MSS	20	ALL	1-10	7
	LSG	DG-8	COARSE ENCODER LSS	22	ALL	1-10	11
	LSG	DG-9	FINE ENCODER MSS	24	ALL	1-10	6
	LSG	DG-10	FINE ENCODER LSS	25	ALL	1-10	12
	LSG	DG-10	FINE ENCODER LSS	26	ALL	1-10	12
	LSG	DG-10	FINE ENCODER LSS	27	ALL	1-10	12
	LSG	DG-10	FINE ENCODER LSS	28	ALL	1-10	12
	LSG	DG-10	FINE ENCODER LSS	29	ALL	1-10	12
	LSG	DG-10	FINE ENCODER LSS	30	ALL	1-10	12
	LSG	DG-10	FINE ENCODER LSS	32	ALL	1-10	12
	LSG	DG-7	COARSE ENCODER MSS	34	ALL	1-10	7
	LSG	DG-8	COARSE ENCODER LSS	35	ALL	1-10	11
	LSG	DG-8	COARSE ENCODER LSS	36	ALL	1-10	11
	LSG	DG-8	COARSE ENCODER LSS	37	ALL	1-10	11
	LSG	DG-8	COARSE ENCODER LSS	38	ALL	1-10	11
	LSG	DG-8	COARSE ENCODER LSS	40	ALL	1-10	11
	LSG	DG-9	FINE ENCODER MSS	42	ALL	1-10	6
	LSG	DG-10	FINE ENCODER LSS	44	ALL	1-10	12
	LSG	DG-7	COARSE ENCODER MSS	46	ALL	1-10	7
	LSG	DG-8	COARSE ENCODER LSS	48	ALL	1-10	11
	LSG	DG-9	FINE ENCODER MSS	50	ALL	1-10	6
	LSG	DG-10	FINE ENCODER LSS	52	ALL	1-10	12
	LSG	DG-7	COARSE ENCODER MSS	54	ALL	1-10	7
	LSG	DG-8	COARSE ENCODER LSS	56	ALL	1-10	11
	LSG	DG-9	FINE ENCODER MSS	58	ALL	1-10	6
	LSG	DG-10	FINE ENCODER LSS	60	ALL	1-10	12
	LSG	DG-7	COARSE ENCODER MSS	62	ALL	1-10	7
	LSG	DG-8	COARSE ENCODER LSS	64	ALL	1-10	11

1.5.2 LUNAR SEISMIC PROFILING (LSP) EXPERIMENT TELEMETRY DESCRIPTION

1.5.2.1 LSP Downlink Description

The LSP data is downlinked at 3.5333 KBPS, normal rate, and 1.06 KBPS, low rate. The frame is broken into 3 subframes, each consisting of twenty 30-bit words. The characteristics of the downlink are as follows:

- o 3.5333 KBPS normal rate, NRZ-C PCM
- o 1.06 KBPS low rate, NRZ-C PCM
- o 1.963 frames per second normal rate
- o 0.588 frames per second low rate
- o 3 subframes per frame
- o 20 words per subframe
- o 30 bits per word

Each 30-bit downlink word will be subdivided into smaller data words. The first word in each subframe is broken into one 10-bit sync word and one 5-bit seismic data sample from each of the four seismic data channels. Each of the remaining 19 words of each subframe shall consist of one 7-bit seismic data sample from each of the four seismic data channels and a 2 bit subcom. The 2-bit subcom will contain the geophone amplifier gain status, transmitter on/off status subframe identification, and 8-bit samples from 12 engineering channels, four in each subframe. The geophone samples shall be formed from either the five or seven most significant bits of the 8-bit A/D converter, read out most significant bit first.

During LSP operation, all multiplexing of the LSP and ALSEP engineering data will be by the LSP 16-channel multiplexer. Output of the normal ALSEP data stream will be discontinued until the termination of the LSP operation.

The LSP low data rate will not be supported by the real-time ground data flow.

A biased A to D converter is used in the experiment for the geophone data words so that a zero input produces an output of 64 counts.

LSP WORD NUMBER

LSP BIT NO.

LSP SUB FRAME 1

LSP SUB FRAME 2

LSP SUB FRAME 3

LSP WORD NUMBER	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30		
1	0	0	0	0	1	1	1	0	1	1	DP-1	DP-6	DP-11	DP-16																		
2											DP-1	DP-6	DP-11	DP-16	I	D																
3															X	S	T															
4															2 ⁷	2 ⁶																
5															2 ⁵	2 ⁴																
6															2 ³	2 ²																
7															2 ¹	2 ⁰																
8															2 ⁷	2 ⁶																
9															2 ⁵	2 ⁴																
10															2 ³	2 ²																
11															2 ¹	2 ⁰																
12															2 ⁷	2 ⁶																
13															2 ⁵	2 ⁴																
14															2 ³	2 ²																
15															2 ¹	2 ⁰																
16															2 ⁷	2 ⁶																
17															2 ⁵	2 ⁴																
18															2 ³	2 ²																
19															2 ¹	2 ⁰																
20															1	1																
1	0	0	0	0	1	1	1	0	1	1	DP-1	DP-6	DP-11	DP-16																		
2											DP-1	DP-6	DP-11	DP-16	I	D																
3																																
4															2 ⁷	2 ⁶																
5															2 ⁵	2 ⁴																
6															2 ³	2 ²																
7															2 ¹	2 ⁰																
8															2 ⁷	2 ⁶																
9															2 ⁵	2 ⁴																
10															2 ³	2 ²																
11															2 ¹	2 ⁰																
12															2 ⁷	2 ⁶																
13															2 ⁵	2 ⁴																
14															2 ³	2 ²																
15															2 ¹	2 ⁰																
16															2 ⁷	2 ⁶																
17															2 ⁵	2 ⁴																
18															2 ³	2 ²																
19															2 ¹	2 ⁰																
20															0	1																
1	0	0	0	0	1	1	1	0	1	1	DP-1	DP-6	DP-11	DP-16																		
2											DP-1	DP-6	DP-11	DP-16	I	D																
3																																
4															2 ⁷	2 ⁶																
5															2 ⁵	2 ⁴																
6															2 ³	2 ²																
7															2 ¹	2 ⁰																
8															2 ⁷	2 ⁶																
9															2 ⁵	2 ⁴																
10															2 ³	2 ²																
11															2 ¹	2 ⁰																
12															2 ⁷	2 ⁶																
13															2 ⁵	2 ⁴																
14															2 ³	2 ²																
15															2 ¹	2 ⁰																
16															2 ⁷	2 ⁶																
17															2 ⁵	2 ⁴																
18															2 ³	2 ²																
19															2 ¹	2 ⁰																
20															1	0																

DP-18/DP-19
 DP-20
 DP-2
 DP-3
 AE-24
 DP-5
 DP-21
 DP-18/DP-19
 SPARE
 AE-3
 AT-16
 DP-10
 AE-4
 DP-21
 DP-18/DP-19
 SPARE
 AB-4
 DP-14
 SPARE
 AB-5
 DP-21

Typical LSP A/G Word Format

WORD 1

BIT	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
CONTENT	SYNC										DP-1					DP-6					DP-11					DP-16				
WEIGHT	0	0	0	0	1	1	1	0	1	1	2^7	2^6	2^5	2^4	2^3	2^7	2^6	2^5	2^4	2^3	2^7	2^6	2^5	2^4	2^3	2^7	2^6	2^5	2^4	2^3

WORDS 2-20

BIT	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
CONTENT	DP-1							DP-6							DP-11							DP-16							SUB-	
WEIGHT	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^7	2^6	2^5	2^4	2^3	2^2	2^1	COM	

DP-18/DP-19 SDS Status Bit Settings

Bit No.
29 30

0	1	Calib. Pulse Off/Geophone Amp. Gain Normal
0	0	Calib. Pulse Off/Geophone Amp. Gain Low
1	1	Calib. Pulse On/Geophone Amp. Gain Normal
1	0	Calib. Pulse On/Geophone Amp. Gain Low

DP-21 Subframe ID Bit Settings

Bit No.
29 30

1	1	Subframe 1
0	1	Subframe 2
1	0	Subframe 3

1.5.2.2 LSP PARAMETER LISTINGS

1.5.2.2.1 LSP ALPHA LIST

REV.	EXP. NAME	MEAS. NO.	MEASUREMENT NAME	LSP		BITS	SUB FRM
				FRM	WD		
	LSP	AB-4	ALSEP C/S EXP 1&2 POWER STATUS	ALL	4,5,6,7	29-30	3
	LSP	AB-5	ALSEP C/S EXP 3&4 POWER STATUS	ALL	16,17,18,19	29-30	3
	LSP	AE-3	ALSEP C/S PC #1 INPUT VOLTAGE	ALL	4,5,6,7	29-30	2
	LSP	AE-4	ALSEP C/S PCU CONV. INPUT CUR	ALL	16,17,18,19	29-30	2
	LSP	AT-16	ALSEP C/S THERMAL PLATE 6 TEMP	ALL	8,9,10,11	29-30	2
	LSP	AE-24	ALSEP C/S RESERVE POWER	ALL	12,13,14,15	29-30	1
	LSP	DP-1	GEOPHONE NO. 1	ALL	1	11-15	ALL
	LSP	DP-1	GEOPHONE NO. 1	ALL	2-20	1-7	ALL
	LSP	DP-2	LSP MUX A/D CAL REF VOLT #1	ALL	4,5,6,7	29-30	1
	LSP	DP-3	LSP DC/DC CONVERTER VOLT OUT	ALL	8,9,10,11	29-30	1
	LSP	DP-5	LSP MUX A/D CAL REF VOLT #2	ALL	16,17,18,19	29-30	1
	LSP	DP-6	GEOPHONE NO. 2	ALL	1	16-20	ALL
	LSP	DP-6	GEOPHONE NO. 2	ALL	2-20	8-14	ALL
	LSP	DP-10	GEOPHONE CAL PULSE AMPLITUDE	ALL	12,13,14,15	29-30	2
	LSP	DP-11	GEOPHONE NO. 3	ALL	1	21-25	ALL
	LSP	DP-11	GEOPHONE NO. 3	ALL	2-20	15-21	ALL
	LSP	DP-14	LSP TEMP MONITOR	ALL	8,9,10,11	29-30	3
	LSP	DP-16	GEOPHONE NO. 4	ALL	1	26-30	ALL
	LSP	DP-16	GEOPHONE NO. 4	ALL	2-20	22-28	ALL
	LSP	DP-17	LSP FRAME SYNC	ALL	1	1-10	ALL
	LSP	DP-18	GEOPHONE CAL PULSE STATUS	ALL	2	29	ALL
	LSP	DP-19	GEOPHONE AMP GAIN STATUS	ALL	2	30	ALL
	LSP	DP-20	RF FIRE PULSES STATUS	ALL	3	29-30	1
	LSP	DP-21	LSP SUBFRAME ID	ALL	20	29-30	ALL

LSP CHANNEL LIST

REV.	EXP. NAME	MEAS. NO.	MEASUREMENT NAME	LSP		BITS	SUB FRM
				FRM	WD		
	LSP	DP-17	LSP FRAME SYNC	ALL	1	1-10	ALL
	LSP	DP-1	GEOPHONE NO. 1	ALL	1	11-15	ALL
	LSP	DP-1	GEOPHONE NO. 1	ALL	2-20	1-7	ALL
	LSP	DP-6	GEOPHONE NO. 2	ALL	1	16-20	ALL
	LSP	DP-6	GEOPHONE NO. 2	ALL	2-20	8-14	ALL
	LSP	DP-11	GEOPHONE NO. 3	ALL	1	21-25	ALL
	LSP	DP-11	GEOPHONE NO. 3	ALL	2-20	15-21	ALL
	LSP	DP-16	GEOPHONE NO. 4	ALL	1	26-30	ALL
	LSP	DP-16	GEOPHONE NO. 4	ALL	2-20	22-28	ALL
	LSP	DP-18	GEOPHONE CAL PULSE STATUS	ALL	2	29	ALL
	LSP	DP-19	GEOPHONE AMP GAIN STATUS	ALL	2	30	ALL
	LSP	DP-20	RF FIRE PULSES STATUS	ALL	3	29-30	1
	LSP	DP-2	LSP MUX A/D CAL REF VOLT #1	ALL	4,5,6,7	29-30	1
	LSP	DP-3	LSP DC/DC CONVERTER VOLT OUT	ALL	8,9,10,11	29-30	1
	LSP	AE-24	ALSEP C/S RESERVE POWER	ALL	12,13,14,15	29-30	1
	LSP	DP-5	LSP MUX A/D CAL REF VOLT #2	ALL	16,17,18,19	29-30	1
	LSP	DP-21	LSP SUBFRAME ID	ALL	20	29-30	ALL
	LSP		SPARE	ALL	3	29-30	2
	LSP	AE-3	ALSEP C/S PC #1 INPUT VOLTAGE	ALL	4,5,6,7	29-30	2
	LSP	AT-16	ALSEP C/S THERMAL PLATE 6 TEMP	ALL	8,9,10,11	29-30	2
	LSP	DP-10	GEOPHONE CAL PULSE AMPLITUDE	ALL	12,13,14,15	29-30	2
	LSP	AE-4	ALSEP C/S PCU CONV. INPUT CUR B	ALL	16,17,18,19	29-30	2
	LSP		SPARE	ALL	3	29-30	3
	LSP	AB-4	ALSEP C/S EXP 1&2 POWER STATUS	ALL	4,5,6,7	29-30	3
	LSP	DP-14	LSP TEMP MONITOR	ALL	8,9,10,11	29-30	3
	LSP		ALSEP C/S ANALOG (SPARE)	ALL	12,13,14,15	29-30	3
	LSP	AB-5	ALSEP C/S EXP 3&4 POWER STATUS	ALL	16,17,18,19	29-30	3

