

**ROSETTA - SESAME**  
**To**  
**ESA PLANETARY SCIENCE ARCHIVE**  
**INTERFACE CONTROL DOCUMENT**

**RLGS-SPEC-SONC\_DPS-SCIE-9241-CNES**

RO-LSE-DS-3102

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## 1 Introduction

### 1.1 Purpose and Contents

The purpose of this EAICD (Experiment to Planetary Science Archive Interface Control Document) is twofold. First, it provides users of the SESAME experiment data with a detailed description of the data archive and a description of how it was generated, including data sources and storage destinations. Secondly, the EAICD is the official interface between the SESAME experiment team and the Philae science data archiving authority.

This document describes the data flow of the SESAME experiment on the *Rosetta* lander *Philae* from the spacecraft until the insertion into the PSA for ESA. It includes information on how data were processed, formatted, labeled and uniquely identified. The document discusses general naming schemes for data volumes, data sets, data and label files. Standards used to generate the product are explained. Software that may be used to access the product is explained further on. The design of the data set structure and of the data product is given.

The naming of levels of processing of SESAME housekeeping and science data is based on the CODMAC definition. For details of this definition and for a cross-reference to other schemes see appendix B of [AD4].

The data format presented in this document comprises the commands and data available in SESAME flight software FM-1 [AD7], FM-2 [AD8] and FM-3 [AD9].

### 1.2 Archiving Authorities

The Planetary Data System Standard is used as archiving standard by

- NASA for U.S. planetary missions, implemented by PDS
- ESA for European planetary missions, implemented by the Research and Scientific Support Department (RSSD) of ESA
- ESA's Planetary Science Archive (PSA)

ESA implements an online science archive, the PSA,

- to support and ease data ingestion,
- to offer additional services to the scientific user community and science operations teams as e.g. search queries that allow searches across instruments, missions and scientific disciplines,
- several data delivery options like
  - direct download of data products, linked files and data sets
  - ftp download of data products, linked files and data sets

The PSA aims for online ingestion of logical archive volumes and will offer the creation of physical archive volumes on request.

### 1.3 Intended Readership

The staff of the archiving authority (SONC and PSA (RSSD, ESA)) and any potential user of the SESAME data.

### 1.4 Applicable Documents

- AD1 SESAME Flight Software User Manual, FM 1.0, RO-LSE-UG-3401, issue 1, revision 2, August 2001
- AD2 SESAME Flight Software User Manual, FM 2.0, RO-LSE-UG-3402, issue 1, revision 0, September 2008
- AD3 SESAME Flight Software FM-3, RO-LSE-UG-3404, issue 1, revision 0, April 2017
- AD4 Planetary Data System Preparation Workbook, 1. February 1995, Version 3.1, JPL, D-7669, Part 1
- AD5 Planetary Data System Standards Reference, Aug. 1, 2003, Version 3.6, JPL, D-7669, Part 2
- AD6 ROSETTA Archive Generation, Validation and Transfer Plan, RO-EST-PL-5011, Issue 2.3, 10 January 2006



- AD7 Rosetta Time handling, RO-EST-TN-3165, Issue 1, Rev. 0, February 9, 2004
- AD8 Command and Data Management System (CDMS) Subsystem Specification, RO-LCD-SP-3101, Issue 3, Rev. 5, 29/08/2001
- AD9 ROSETTA Archive Conventions, RO-EST-TN-3372, Issue 8, Rev. 3, 19 August 2015
- AD10 CDMS DDD, RO-LCD-SW-3610, Issue 6 and above
- AD11 CDMS Command and Data Management System - Subsystem Specification, RO-LCD-SP-3101 29/08/2001, Issue 3, Rev. 5
- AD12 CDMS Command and Data Management System - Operation Manual, RO-LCD-SW-3402, 12/02/2001, Issue 1, Rev. 2
- AD13 Data Delivery Interface Document, RO-ESC-IF-5003, Issue B6, 23/10/2003

## 1.5 Acronyms and Abbreviations

CASSE	Comet Acoustic Surface Sounding Experiment
CDMS	Central Data Management System
Col	Co-Investigator
DAWG	Data Archive Working Group
DDS	Data Distribution System
DIM	Dust Impact Monitor
EAICD	Experiment (planetary science) Archive Interface Control Document
EGSE	Electrical Ground Support Equipment
ESA	European Space Agency
HC	Health-check
HK	Housekeeping
LCC	Lander Control Centre
LOBT	Lander On-Board Time
LSB	Least Significant Bit
MSB	Most Significant Bit
OOBT	Orbiter On-Board Time
PC	Payload Check-out
PCB	Printed Circuit Board
PDS	Planetary Data System
PI	Principal Investigator
PP	Permittivity Probe
PSA	Planetary Science Archive (ESA)
RLGS	Rosetta Lander Ground Segment
RSOC	Rosetta Science Operations Center
RSSD	Research and Scientific Support Department of ESA
S/S	Sub-system(s)
SESAME	Surface Electric Sounding and Acoustic Monitoring Experiment
SFDU	Standard Formatted Data Unit
SIM	Lander simulator (software with some hardware)
SLT	SESAME Local Time
SONC	Scientific Operation and Navigation Center
TBC	To Be Confirmed
TBD	To Be Defined
TC	Telecommand
UTC	Universal Time Coordinated

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## 2 Overview of Scientific Objectives, Experiment Design and Data Products

### 2.1 Scientific Objectives

The activity and evolution of comets is, apart from the magnitude of the solar radiation flux, strongly influenced by the properties of their surfaces. Measurements of surface parameters like composition as well as mechanical and electrical properties and their variation with rotational and orbital phase are of crucial importance. In addition, the knowledge of the local physical, structural and layering properties of cometary surfaces is needed to understand the present processes and the formation history.

These data are required for modeling the gas transport properties of cometary surfaces and related activity phenomena. Describing the gas transport is a necessary prerequisite for a solid interpretation of the gas measurements of, for example, elemental and molecular abundances that are of primary scientific importance for *Rosetta* providing information on the composition of the 'pristine' material of comet nuclei. The diurnal variation of this gas flux is strongly governed by the diffusion properties of upper cometary surface layers. Vice versa, erosion by and re-condensation of this gas flux steadily modifies the surface properties.

The *Surface Electric Sounding and Acoustic Monitoring Experiment* (SESAME, Seidensticker et al., 2007) on the lander *Philae* of the ESA *Rosetta* mission has the goal to determine several of these parameters as well as the properties of released cometary particles. SESAME is a complex of three instruments: The *Comet Acoustic Surface Sounding Experiment* (CASSE), the *Dust Impact Monitor* (DIM) and the *Permittivity Probe* (PP). It is the goal of SESAME to contribute to the understanding of the vertical and lateral structure of a cometary surface and the acting processes by conducting in-situ measurements of mechanical, electrical and particle-related properties.

The analysis of elastic waves, generated and recorded by CASSE, allow deducing mechanical parameters as well as the vertical (layered) structure of the cometary surface.

The DIM instrument measures the properties of impacting ice-dust grains. These data should help to improve our understanding of the lateral variations and how activity can be evoked or choked.

PP determines the complex permittivity of the surface material beneath *Philae*, which is a measure for the water ice content, thereby constraining the mass fractions of refractory material and other ices.

These measurements were envisaged from touchdown until 67P/Churyumov-Gerasimenko, the target comet, reaches its perihelion. Combining observations from other instruments, both on *Philae* and the *Rosetta* orbiter, with the SESAME data should improve models of cometary activity, layering processes and of the heat and gas transport within cometary surfaces.

## 2.2 Experiment Design

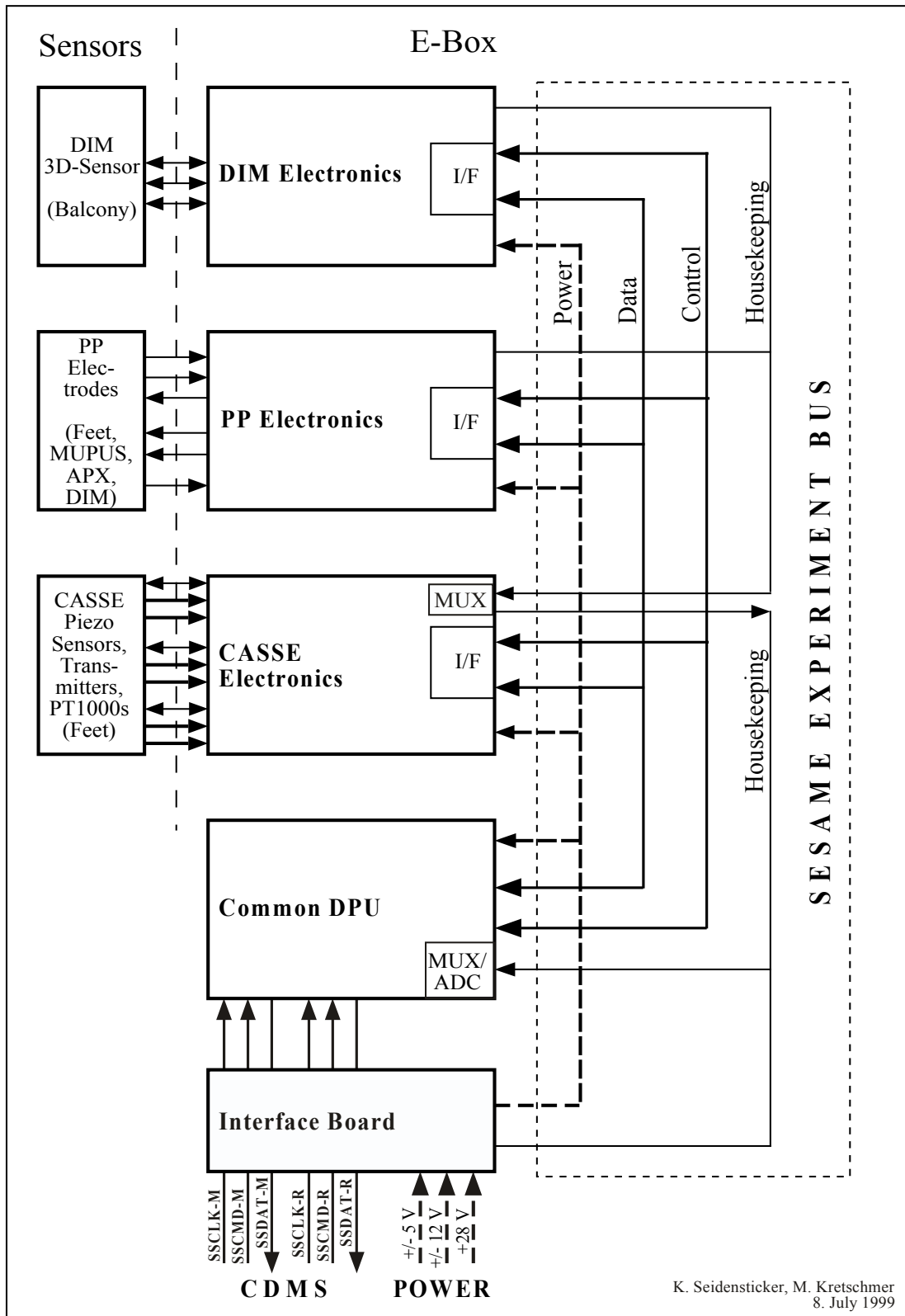


Figure 2.1: The SESAME electronics

### 2.2.1 CASSE

CASSE investigates the outermost surface layers of comet 67P/Churyumov-Gerasimenko by transmitting and receiving elastic waves in the range from 100 Hz to 10 kHz (audible frequency range). To guarantee sufficient ground contact in any foreseeable surface topography and composition (dust, sand, ice and their mixtures), the transmitters (actuators) and the receivers of stacked piezoceramics and triaxial piezoelectric accelerometers are integrated into the lander's six soles. The soles thus act as transmitting and receiving antennas. By switching between actuators and accelerometers, an analysis of the surface material and an in-depth sounding for detection of a layered structure or embedded local inhomogeneities are both possible. Two harpoons fired from *Philae* shall provide a fixation force of at least 5 N per sole in order to improve the ground contact of the soles and thereby the transmission and reception of vibrations.

#### *Measuring principle*

By measuring the propagation time between feet with triaxial accelerometers, the propagation velocities  $c_p$  and  $c_s$  of the compressional and the shear waves can be derived. These velocities are related to the physical parameters and structural composition of the surface material. Identifying and measuring the thickness of subsurface layers, by detecting echoes from a steep gradient in reflectivity, is of great interest.

Physical parameters related to material properties are the elastic parameters Young's modulus  $E$  and Poisson number  $\nu$ . They are related to the velocities of the longitudinal and transverse elastic waves, described as compressional p- and shear s-waves in seismic terms, and the density  $\rho$  of the material. The elastic parameters can also be expressed by other mechanical parameters such as the compressional modulus and rigidity; these are related to other properties such as tensile strength and microstructure.

The interface between the soles and the cometary surface is mostly unknown. The required contact with the cometary surface strongly depends on the sole design and the final acoustic properties of the feet and landing gear. To cope with the unknown physical conditions on and in the comet, acoustic wave propagation experiments have been made in various materials simulating different cometary conditions. Laboratory studies of regolithic dust and sand, and hardened ice/dust mixtures demonstrated that acoustic sounding could be applied to cometary surfaces.

#### *Temperatures*

Temperatures of accelerometers and transmitters are monitored by PT1000 sensors in the soles of *Philae*'s landing gear. Due to a hardware issue, the measurement of very low temperatures using these sensors is not straight forward. Since flight software version FM-2, a software workaround is available as described in AD3. Nevertheless the calibration of CASSE temperatures must be considered as preliminary and resulting temperatures as uncertain. The calibration currently applied in the archive is designed such that a smooth transition between the FM-1 and FM-2 calibrations is achieved.

### 2.2.2 DIM

Most of the comet's surface is expected to be freely sublimating ice and embedded dust. When ice is exposed to solar radiation, sublimating gas molecules drag away embedded ice/dust grains of different sizes. The combined action of gas drag and gravitational forces means that the majority of the grains is either ejected into interplanetary space (smaller particles) or falls back to the nucleus (larger particles). DIM, mounted on *Philae*'s balcony, will observe these particles.

DIM's data help to monitor the downward flux of grains as a function of orbital position and cometary activity (along with daily variations). This allows the development of better models for the distribution and flux of near-surface dust and small particles as a function of their size and velocity. The impact properties allow the acoustic signals of external and internal origin to be separated. As a bonus, this experiment may help to identify the Lander vibration noise that needs to be removed from the acoustic and seismic measurements.

#### *Instrument principle*

DIM's piezoelectric sensor on the balcony detects the impacts of particles having energies of  $10^{-11}$ - $10^{-7}$  J, radii of 50  $\mu\text{m}$  - 6 mm and speeds of 2.5 cm/s - 0.25 m/s. The sensor's active area is about 70  $\text{cm}^2$ . The low-level electrical output signals pass through a wideband logarithmic amplifier to retain their broad dynamic range. A data acquisition unit (DAU) measures the impact characteristics (peak amplitudes, contact times, averages). The DAU is connected to SESAME's Common Data Processing Unit (DPU) by the SESAME Experiment Bus.

The sensor output is a fast or slow decaying sinusoid transient electric signal (depending on the parameters of the impacting particles). An impact is detected by a threshold detector, where the threshold is the sum of the average of the signal and a margin. The margin is programmable in order to adjust the sensitivity of detection. As the impact rate increases, the average will be increased to reduce sensitivity so that the system is not saturated: fewer impacts will be detected.

Further, the average value of the amplified signal is sampled. In the case of very low impact rates, this is roughly equivalent to the electronic and background noise average. For very high impact rates, the individual impacts cannot be distinguished so only the average value of the signal is measured. This switchover from measuring individual impacts (Burst Mode) to the average (Average Mode) is automatic and is based on the measured average. The default is Burst Mode, but the Average Mode can be selected separately on command.

### 2.2.3 PP

The PP instrument is mainly a quadrupole detector using two transmitter and two receiver electrodes at any given time in so-called active mode. An AC-voltage, digitally generated by a sequencer inside the common electronics in the frequency range between 10 Hz and 20 kHz and amplitudes up to  $\pm 10V$ , is injected between two transmitter electrodes. The resulting current can be sampled with up to 180 kHz sampling frequency on either of the two electrode's driver circuits. This current generates an electrical field inside the comet's surface material, which is picked up by the two receiver electrodes Rx1 and Rx2, placed inside the soles of the +Y and -Y landing gear leg, respectively.

#### *Receiver*

The measured potentials are amplified by preamplifiers, also inside these soles, by a factor of 8 and buffered to drive the long sensor cables into the Lander compartment. The PP electronics generates automatically the differential voltage between both signals, which is subsequently sampled at exactly the same moment as the corresponding current sample.

The resulting 8-bit values are stored in PP's on memory in alternating order, current values first, followed by the differential potential value. At the end of a measurement with given frequency and amplitude, the SESAME common DPU reads these data into the main memory, sorts them according to type (current or voltage) and places these vectors into the telemetry or use them for further on-board processing.

#### *Transmitter*

To achieve different geometries and thereby different penetration depths, three transmitter electrodes are implemented, which can be used in any combination. Tx1 is placed as metal mesh on the inside of the +X landing gear foot sole, Tx2 is implemented as an insulated ring lid to the APX detector, which is in contact with the comet surface once APX is lowered. Tx3 is a flexible mesh foil attached to the MUPUS PEN, lying on the comet surface the moment the PEN is deployed, from the beginning of the insertion process. In case none of the other detectors is deployed, an emergency measurement is possible using only the +X landing gear transmitter Tx1 and as return the grounding of the Lander through the harpoons. The precision of the measurements in this case would be severely reduced. The selection of the transmitter electrode pair is done by electronic switches under software control and is one of the active mode's configuration parameters.

The AC-signal is generated from a set of up to 256 8-bit values, stored before each measurement into PP's memory. The value 128 corresponds roughly to 0 V, 255 to +10 V and 0 to -10 V. Using adjustable sequencer timing and a sine wave with different amplitudes as data set, the intended frequency and signal level can be defined. Amplitude control is used to optimize the returned current and potential signals for different material properties to the dynamic range of the digitalization module.

#### *Passive mode*

If the transmitter part is not used, the receivers are able to pick up potential variations caused e.g. by plasma waves in the vicinity of the Lander. In PP's passive mode, the potential difference is sampled with a fixed frequency of 20 kHz. The resulting data of a 1-second measurement can be sent directly via telemetry to ground for analysis. Optionally, flight software analyses the data directly on board and places only a logarithmic 10-bin power spectrum into the telemetry stream instead.

#### *Plasma wave sensor (Langmuir Probe)*

An additional sensor wire on top of the DIM sensor cube monitors the electrical field in the vicinity to help interpreting plasma wave like events. Field variations faster than a few Hertz cause a current flow through an integrator of the electronics. Once a minimum total charge is registered, a timer is activated and stopped again when a pre-set total charge is reached. The resulting timer value is transferred as Langmuir Probe value in the housekeeping part of SESAME's telemetry or as science part during a dedicated measurement. If no signal is detected, the timer stops at its maximum value of hexadecimal FFFF, which then is transmitted. The timer frequency can be adjusted by command to increase the sensitivity of the sensor.

For power conservation, the three electronics groups, receiver, transmitter and Langmuir Probe are powered separately by electronic switches. Additionally, the sequencer's clock is disabled as long as no measurement is performed or the memory has to be accessed.

### *Housekeeping*

All analog signals are routed through an 8-channel multiplexer to the same 8-bit Analog-to-Digital-Converter (ADC). The software controlled multiplexer channel selection defines which analog parameter is digitized to be placed into the position of the first value of each sample pair mentioned above. During the health-check all eight channels are read out, providing information about the three transmitter electrodes' current monitors, the state of each receiver chain separately and the  $\pm 5V$  reference voltages defining the calibration of the analog electronics. Additionally the multiplexer can be disconnected, allowing characterizing the ADC separately. A series resistor in the +5V power supply line for the digital part of PP's electronics not only serves as latch-up protection but allows also to monitor the power consumption of the digital part. The voltage after the resistor is divided by 2 and then monitored by the ADC on the CASSE board. The result is part of the SESAME housekeeping data set, the difference to the also returned input voltage is a direct measure for the current and thereby the health of the digital part of the PP electronics board.

## **2.3 Data Handling Process**

SONC is responsible for the generation of the SESAME PDS data sets and the delivery to the PSA. The SESAME team will support this activity by delivering the relevant calibration information. The relevant contact information is provided in section 1.6. The SESAME PI is responsible for the distribution to the SESAME team.

### *2.3.1 Periods*

Two operation periods must be distinguished in the SESAME data handling process:

- I. The in-flight activity after the launch including the Commissioning and Cruise phases. Data produced during this period are in most cases (TBD) not scientifically relevant.
- II. The in-flight scientific mission starting with the Close Observation Phase until Lander shutdown. Only this period produces scientific data.

Two data delivery periods to PSA should be distinguished:

- A. Just after the proprietary period, raw data already available at SONC, i.e. up to Level 2.
- B. When ready, calibrated SC data and reduced data (up to Level 3) will be generated and distributed to PSA.

### *2.3.2 Data Handling*

The science data packets are retrieved in SFDU format from ESA's Data Distribution System (DDS) and archived at SONC in CDMS packets format, along with the housekeeping telemetry packets that are necessary to monitor the instruments.

The packet-specific fields are stripped out in order to reconstitute the science raw data, which are also time stamped in UTC, and stored in the SONC database. These data are furthermore converted to physical units.

All these data are electronically accessible to the PI's and Co-I's (<http://soncv2-rosetta.cnes.fr>) according to data distribution agreements between these people and enforced by access rights at SONC.

The elaboration of PDS files is handled by SONC:

As soon as the science (SC) and housekeeping (HK) data are available at SONC (starting with the commissioning data), the PDS files are directly produced from the archived data at SONC.

After this first formatting, these data are electronically available to the SESAME team in order to be analyzed, and possibly recalibrated under his control, as well as qualified according their quality. SONC will derive the geometry related keyword parameters from the adequate Spice kernel for data sets level 2 and above. Then, just after the proprietary period (six month as a minimum), the SONC team will provide the raw and calibrated data to the PSA.

At any rate, the long-term archive is constituted at SONC. SONC is responsible for the gathering of the necessary data from the SESAME team and the distribution of the PDS-formatted data to the archive team of the RSOC. The PI's are responsible for the organization of data and their scientific correctness. The SONC controls the archive completeness before handing it over to the archive team of the RSOC, and generates the global indices.

## 2.4 Overview of Data Products

### 2.4.1 Pre-Flight Data Products

There are no pre-flight data archived to PSA.

### 2.4.2 Sub-System Tests

The various health-checks procedures, implemented e.g. in the SESAME Cruise Functional Test, will be used to check the status of each instrument and its sensor modifications with the changing environment:

**CASSE Health Check (CAS-HC):**

The CAS-HC will be used to follow-up the behavior of the CASSE transmitters and accelerometers with temperature and mechanical environment (in space or fixed to the cometary surface).

**DIM Health Check (DIM-HC):**

The DIM-HC consisting of several sub-tests (Power Check, Noise Test, Calibration and Sensor Test) will be used to check the actual properties of the sensor plates and the operating environment (noise).

**PP Health Check (PP-HC):**

The PP-HC monitors the functioning and long-term stability of all PP electronics sub-systems. The included LP-value shows plasma wave events in case they happened at the time the health-check was performed. The +5V value indicates the current consumption of the digital part, which might be a function of radiation degradation over time.

These tests are described in AD3.

### 2.4.3 Instrument Calibrations

Although most of the SESAME measurements are relative, the following information should be used to calibrate and correct the science data:

#### **CASSE**

Amplification factors to calculate the signal strength in voltage

Pre-launch Brüel & Kjaer calibration of CASSE accelerometers (transfer from voltage to acceleration)

#### **PP**

Calibration functions for digital current consumption in mA

Transmitter currents in mA

Potential values in mV

#### **DIM**

One sub-test (Calibration) of the DIM Health Check (DIM-HC) is for calibrating the log-amplifier (i.e. to determine the actual slope of the log-characteristic of the log-amplifier). The measured U, A values must be corrected according to the result of this calibration.

The SESAME team will provide and update relevant information so that the processing pipeline is up to date with the current understanding of the characteristics of SESAME.



The calibration files will be available at the SESAME laboratories and SONC. A release will be provided to PSA whenever they are refined. The delivery format is described in chap. 3.4.3.2 (Calibration directory).

## 2.4.4 In-Flight Data Products

Most In-Flight (science) data had been produced during mission phases “Post Hibernation Commissioning” to “First Science Sequence”. But we intend to deliver also our in-flight sub-system tests (see chap. 2.4.2) as well as other cruise data, which are useful for SESAME calibration as well as monitoring of Lander and Orbiter vibration. In addition, we are checking whether science data (particle impacts and plasma waves) can be obtained during Cruise and or Fly-Bys.

In-flight data products cover four data processing levels:

### **Raw telemetry (CODMAC level 1):**

HK and SC SESAME packets (rolbin files) as received from DDS. These data will be available at ESOC, SONC, SESAME and PSA. They will be delivered to PSA during period A (after the proprietary period).

### **Raw data (CODMAC level 2):**

SC raw data (edited data) separated for each instrument (CASSE, DIM, PP). The data will be available at SONC, SESAME and PSA. They will be delivered to PSA during period A (after the proprietary period).

### **Calibrated HK data (CODMAC level 3):**

Housekeeping data in scientific units and time tagged. The data will be available at SONC, SESAME and PSA. They will be delivered to PSA during period A (after the proprietary period).

### **Calibrated SC data (CODMAC level 3):**

Calibrated science data, time-tagged and separated for the SESAME instruments CASSE and PP. The data will be available at SONC, SESAME and PSA. They will be delivered to PSA in period B (when ready).

The data are produced during following mission phases (Table 2.1).

Table 2.1: Mission phases

MISSION_PHASE_NAME	Abbreviation	Start Date (dd/mm/yyyy)	End Date (dd/mm/yyyy)	SESAME data (1)
Commissioning (part 1)	CVP1	05/03/2004	06/06/2004	<b>CASSE, DIM, PP</b>
Cruise 1	CR1	07/06/2004	05/09/2004	
Commissioning (part 2)	CVP2	06/09/2004	16/10/2004	<b>CASSE, DIM, PP</b>
Earth Swing-by 1 (including PC#0)	EAR1	17/10/2004	04/04/2005	<b>CASSE, DIM, PP</b>
Cruise 2 (including PC#1,2)	CR2	05/04/2005	28/07/2006	<b>CASSE, DIM, PP</b>
Mars Swing-by (including PC#3,4,5)	MARS	29/07/2006	28/05/2007	<b>CASSE, DIM, PP</b>
Cruise 3	CR3	29/05/2007	12/09/2007	
Earth Swing-by 2 (including PC#6, 7)	EAR2	13/09/2007	27/01/2008	<b>CASSE, DIM, PP</b>
Cruise 4-1 (including PC#8)	CR4A	28/01/2008	03/08/2008	<b>CASSE, DIM, PP</b>

Steins Flyby	AST1	04/08/2008	05/10/2008	<b>CASSE</b>
Cruise 4-2 (including PC#9)	CR4B	06/10/2008	13/09/2009	<b>CASSE, DIM, PP</b>
Earth Swing-by 3 (including PC#10)	EAR3	14/09/2009	13/12/2009	<b>CASSE, DIM, PP</b>
Cruise 5 (including PC#12)	CR5	14/12/2009	06/06/2010	<b>CASSE, DIM, PP</b>
Lutetia Flyby	AST2	07/06/2010	10/09/2010	
RV Manoeuver 1 (including PC#13)	RMV1	11/09/2010	13/07/2011	<b>CASSE, DIM, PP</b>
Cruise 6	CR6	14/07/2011	22/01/2014	

Post Hibernation Commissioning	PHC	09/04/2014	24/04/2014	<b>CASSE, DIM, PP</b>
Pre-delivery calibration Science	PDCS	25/04/2014	11/11/2014	<b>CASSE, DIM, PP</b>

(1) The last column indicates if SESAME data are available, the first one indicates if data can come from a Payload Checkout.

After the release of the Lander, we distinguish four phases, characterized by:

- The Start and Stop dates need to be expressed in seconds
- The Lander has its own Auxiliary data

Separation/Descent/Landing	SDL	2014/11/12 08:35:02	2014/11/12 16:15:00	<b>CASSE, DIM, PP</b>
Rebounds	RBD	2014/11/12 16:15:00	2014/11/12 17:30:20	
First Science Sequence	FSS	2014/11/12 17:30:21	2014/11/15 01:00:00	<b>CASSE, DIM, PP</b>
Long Term Science	LTS	N/A	N/A	N/A

SESAME data can come from three flight software versions (FM-1, FM-2 and FM-3) whose validity periods are given below:

<b>Flight Software</b>	<b>Begin (Date Time)</b>	<b>End (Date Time)</b>
FM-1	2004/03/02 00:00:00 (launch)	2007/09/24 19:39:59
FM-2	2007/09/24 19:40:01 (PC#6)	2009/09/24 01:59:59
FM-3	2009/09/24 02:00:01 (PC#10)	Today

### 2.4.5 Software

No SESAME software will be delivered.

### 2.4.6 Documentation

The documentation directory contains the following documents:

- EAICD (This document, PDF file)
- SES\_CAS\_CALIBRATION\_DESC.ASC (ASCII file)
- SES\_DIM\_CALIBRATION\_DESC.ASC (ASCII file)
- SES\_PP\_CALIBRATION\_DESC.ASC (ASCII file)
- RL\_SESAME\_LOGBOOK.ASC, SESAME operations timeline ASCII file (ASCII file)
- LSE-SW-FM1-UM.PDF (SESAME Flight Software User Manual, version FM 1.0)

- LSE-SW-FM2-UM.PDF (SESAME Flight Software User Manual Flight Software Version FM-2)
- LSE-SW-FM-3-TC-TM.PDF (SESAME Flight Software FM-3, Telecommand and Telemetry Formats)

## 2.4.7 *Derived and other Data Products*

There are no derived products for SESAME.

## 2.4.8 *Ancillary Data Usage*

### 2.4.8.1 Combined Rosetta / Lander operation

Two periods should be distinguished:

The first period starts after the launch until the close Comet approach. During this period the Lander is fixed to the Orbiter and they share the same auxiliary data that is the FD (Flight Dynamic) files. In order to interpret temperature and vibration data the Orbiter / Lander geometry as well as operational details (e.g. Orbiter gyro operation) should be known.

The next period is the global mapping to close observation phase. In addition to the first period, the geometry w.r.t. the target comet as well as to sun should be known in order to interpret particle impacts on CASSE and DIM sensors. As well these data should support the analysis of PP passive and Langmuir mode measurements.

### 2.4.8.2 Lander delivery and relay

The third period is Lander delivery and relay (SSP). After the separation from the Orbiter, and particularly during the Comet activity phase, the Lander will have its own auxiliary data:

- Lander orientation
- Localization in space
- Sun direction
- Rosetta/Lander Timeline

The "Rosetta/Lander Timeline" is a text file describing the working context and scheduling (on-off of each experiment, performed commands etc.). This file will be produced by SONC from CDMS and HK telemetries.

### 2.4.8.3 On-comet operation

The final operation period is the On-comet operation (LOW to PERI). In addition to the data mentioned in chap. 2.4.8.2 the following parameters are needed for SESAME data processing:

- Orientation of the Lander / rotation angle
- Drill status: in contact with the surface or not
- Direction and incident angle of the Sun (separate for Landing Gear and the upper Lander (rotation!))
- Distance and position angle of the MUPUS PEN, once deployed

The Sun information is only needed for scientific evaluation of the data later on.

The Lander Auxiliary Data on the comet (Position / Orientation / Illumination at any time + Comet models + Ancillary Data from the instruments) are available in an ANCDR (Ancillary Data Record) data set accessible from the ESA's Planetary Science Archive (PSA).

The following special information is needed for processing SESAME instrument data:

#### CASSE

- MUPUS deployment location (MUPUS PEN tip position) in LDR coordinate frame

#### DIM

None.

*PP*

- APXS status: extended or not
- Impact point of the harpoon(s)

Most of the listed information is needed to translate the measured current and potential values correctly into permittivity and conductivity of the comet surface material.

## 3 Archive Format and Content

### 3.1 Format and Conventions

Throughout this document, the SESAME data processing status will be indicated by the CODMAC code levels (see Table 3.1 and AD6 (Appendix B)).

Table 3.1: CODMAC code levels

1: <i>Raw Data</i> : Telemetry data with data embedded.
2: <i>Edited Data</i> : Corrected for telemetry errors and split or decommutated into a data set for a given instrument. Sometimes called Experimental Data Record. Data are also tagged with time and location of acquisition. Corresponds to NASA Level 0 data.
3: <i>Calibrated Data</i> : Edited data that are still in units produced by instrument, but that have been corrected so that values are expressed in or are proportional to some physical unit such as radiance. No re-sampling, so edited data can be reconstructed. Corresponds to NASA Level 1A.
4: <i>Re-sampled Data</i> : Data that have been re-sampled in the time or space domains in such a way that the original edited data cannot be reconstructed. Could be calibrated in addition to being re-sampled. Corresponds to NASA Level 1B.
5: <i>Derived Data</i> : Derived results, as maps, reports, graphics, etc. Corresponds to NASA Levels 2 through 5
6: <i>Ancillary Data</i> : Non-science data needed to generate calibrated or re-sampled data sets. Consists of instrument gains, offsets, pointing information for scan platforms etc.

#### 3.1.1 Deliveries and Archive Volume Format

A data set will be delivered for each **simple mission phase**. Each data set will contain **only one level data processing**. The list of simple mission phases is given in AD9 (table 3).

A data set will be level-stamped as below:

Level 1 when it will contain raw telemetry data:

- SC and HK packets as received from DDS and mixed together in binary files (.rolbin).

Level 2 when it will contain raw science data:

- SC edited data (uncalibrated) separated by instrument in ASCII files (.TAB).
- PP SC data will also be separated according to operation mode.

Level 3 when it will contain calibrated data:

- HK calibrated data in ASCII file (.TAB)
- CASSE nominal calibrated time series (acceleration vs. time) (.TAB)
- PP:
  - Calibrated Health-Check data in ASCII files (.TAB)
  - Calibrated current / voltage time series for active test measurements in ASCII files (.TAB)
  - Calibrated frequency / current amplitude / voltage amplitude / phase data sets for active measurements in ASCII files (.TAB)
  - Calibrated electric field densities (electric field density vs. frequency bin) and calibrated potential difference time series (voltage vs time) (passive mode) in ASCII files (.TAB)

In addition a data set will contain:

- Software (in level 1 datasets)
- Calibration files (in level 3 datasets)
- Documents (see chapter 2.4.6)

A new data set release is provided when:

- The calibration information has been refined
- Additional data has been processed
- Data have been processed to a higher CODMAC level.

### 3.1.2 Data Set ID / Name Formation

The following naming formation scheme will be used for the SESAME data sets:

DATA\_SET\_ID = <INSTRUMENT\_HOST\_ID>-<target id>-<INSTRUMENT\_ID>-<data processing level number>-<mission phase abbreviation>-<description>-<version>

DATA\_SET\_NAME = <INSTRUMENT\_HOST\_NAME> <target name> <INSTRUMENT\_ID>  
 <data processing level number> <mission phase abbreviation> <description> <version>

See AD9 (chaps. 2.1.1 and 2.1.2).

The target name will contain the name of the mission phase and the description field (optional) will be used to specify the name of the operation phase during the Cruise (swing-by and flyby).

Example of DATA\_SET\_ID and DATA\_SET\_NAME for the level 3 Comet phase data:

DATA\_SET\_ID = "RL-C-SESAME-3-COM-V1.0"

DATA\_SET\_NAME= "ROSETTA-LANDER 67P SESAME 3 COM V1.0"

Example of DATA\_SET\_ID and DATA\_SET\_NAME for the level 2 Mars swing-by data:

DATA\_SET\_ID = "RL-M-SESAME-2-MARS-V1.0"

DATA\_SET\_NAME= "ROSETTA-LANDER MARS SESAME 2 MARS PC#3-4-5 V1.0"

### 3.1.3 Data Directory Naming Convention

The DATA directory contains flight data obtained after Rosetta launch. Data are sorted into sub-directories according to the three SESAME instruments and their modes. An extra sub-directory (SESAME) is used for general SESAME-related data (mainly HK) where applicable.

The top-level sub-directories have names according to the instruments:

## SESAME/

- HK SESAME general housekeeping data. Data might be extracted and duplicated to other data sets
- SC Health Check data (from COM\_HK telecommand),  
Content of Backup RAM Buffer (from COM\_RBUF TC),  
Messages in the science data stream: Ready Message and Error Messages

## CASSE/

- SC First 16 words of Jobcard (from COM\_RDJC TC)
- LI Data collected during Listening mode
- TR Data collected during Trigger mode
- SN Data collected during Sounding mode
- HC Data collected during CASSE Health Check mode
- ST Data collected during the Stacking mode

## DIM/

- AV Data collected from Average Continuous and Average Continuous Test modes  
Continuous data: overlapping impacts (at high flux) gradually prohibit getting data of a single impact: therefore only the Average is measured. Transition limit can be defined between Burst\_Continuous / Average\_Continuous.  
A (Average), Selected Direction (X or Y or Z), Sampling time (i.e. the frequency of sampling from the averaged signal of the sensor).  
The Average Continuous Test mode is similar to the Average Continuous mode but raw voltage values of average samples are additionally included into TM stream
- BC Data collected during the Burst Continuous mode.  
Burst data (data of individual impacts): U (Peak amplitude), T (Contact time), selected Direction (X or Y or Z), selected Margin (i.e. selected sensitivity)
- CAL Data collected during the Calibration mode
- HC Data collected during the DIM Health Check
- NT Data collected during the Noise Test Mode
- PC Data collected during the Power Check mode
- ST Data collected during the Sensor Test mode

## PP/

- AM Active mode data either from AMTEST or AM modes, permittivity data
- HC Data collected during PP Health Check mode
- LM Data collected during the Langmuir Probe Test mode
- PM Data collected during the Passive mode and Passive mode Test for plasma wave measurements

### 3.1.4 File naming Convention

The data levels 2 and 3 depend on instrument mode whereas data level 1 does not. Consequently, there are two different file naming schemes defined according to the data level as follows.

File naming scheme for **level 1**:

FILE\_NAME = <experiment>\_<data type>\_<begin of observation>.<ext>

**SES\_XYZ\_yymmddhhmn.ext**

**<experiment>** (3 characters) = **SES**

**<data type>** (3 characters) = XYZ

- X = **G** for Ground, **F** for Flight
- Y = **S** for Science Data, **H** for Housekeeping Data, **B** for files with both data types mixed together
- Z = CODMAC level: **1** (for raw packets)

**<begin of observation>** (10 characters) = start time of test or working session. Two sessions will be separated by at least 15 minutes.

yymmddhhmn

- yy = year
- mm = month
- dd = day
- hh = hour
- mn = minute

**<ext>** (file extension) = ROL

File naming scheme for **levels 2 and 3**:

FILE\_NAME = <experiment>\_<data type>\_<mode>\_<begin of observation>\_<data description.<ext>

**SES\_<XYZ>\_<imo>\_<yymmddhhmn>\_<desc>.ext**

**<experiment>** (3 characters): **SES**

**< XYZ >** (3 characters):

- X = **G** for Ground, **F** for Flight
- Y = **S** for Science Data, **H** for Housekeeping Data, **B** for files with both data types mixed together
- Z = CODMAC level: **2** for raw instrument data, **3** for calibrated data (SC or HK), **5** for derived data

**< imo >** (3 characters):

- **i** = instrument (1 character) : **S, C, D, P**  
**S** (SESAME) for common data, **C** for CASSE data, **D** for DIM data, **P** for PP data
- **mo** (2 characters) = mode (see Table 3.2)  
 “\_” for SESAME

**< yymmddhhmn >** (10 characters): start time of test or working session. A session corresponds to one instrument and one mode:

- yy = year
- mm = month
- dd = day
- hh = hour
- mn = minute

**<desc>** (4 characters maximum) = data description (see Table 3.2)

**<ext>** (file extension) = TAB



Table 3.2 Values of fields “mode” and “desc” in the SESAME filename

Instrument	Modes (mode field)	Description (desc field)
<b>SESAME</b>	-	HC, HK, RBUF, RDJC, RMES, EMES, WPENZ
<b>CASSE</b>	SN, LI, TR, ST, HC	JOBC, SEQP, DATA, STAT, TAFT
<b>DIM</b>	HC, PC, NT, ST, CA, AV, BC	Depends of DIM mode: HC, PC, NT, CA: ST : X, Y, Z BC : PAR, AM, BM BCTEST, AV, AVTEST: PAR, SIG
<b>PP</b>	HC, AM, AT, PM, PT, LM	HC, LM: AM: PAR, DATA AMTEST: TPAR, TTX, TRX, TDAC PM: PAR, POW PMTEST: TPAR, TPOW, TRX, TCH

Example: SES\_FB1\_0510040300.ROL

This file begins at 2005/10/04 03:00 and contains the SESAME (SC and HK) packets.

The corresponding level 2 data file for a CASSE sounding would be:

SES\_FS2\_CSN\_0510040300\_DATA.TAB

## 3.2 Standards Used in Data Product Generation

### 3.2.1 PDS Standards

The PDS standard used is that of PDS version 3.6 as described in AD5.

### 3.2.2 Time Standards

#### 3.2.2.1 Generalities

This paragraph gives a summary of the different existing formats in the Rosetta Ground segment, from their generation by the instruments to their availability at SONC:

- ◆ The Lander CDMS requires the scientific instruments to transmit the data by bursts of 8 or 64 bytes (4 or 32 16-bit words)
- ◆ When sufficient data are received, the CDMS builds packets containing 256 bytes of instrument data. The CDMS adds 18 bytes header (unit PID, sequence count, OOBT: Orbiter OBT, data type) and a 2 bytes checksum (DECW) and creates packets with a fixed length of 276 bytes<sup>1</sup>. For transmission between Lander and Orbiter, a 4 bytes synchronization header and a 2 bytes trailing checksum (PECW) are added, increasing the packet size to 282 bytes. The extra bytes are removed by the ESS.

---

<sup>1</sup> The Lander CDMS header and the headers of the telemetry source packets from the Orbiter instruments are quite similar. There is a difference in the data field header. The byte containing PUS version, checksum flag and spare fields is set to zero in the CDMS header. Besides the last byte of the OOBT is set to zero in the CDMS header. The CDMS header has an additional word (2 bytes) after the data field header named "FORMAT ID". This word is mainly used for HK data and it contains the HK scanning period and the SID (structure identification).

To comply with ESA requirements, the time registered in the CDMS packets is the Orbiter On-Board Time (**OObT**). It is reconstituted from the Lander On-Board Time (**LObT**), as shown in Figure 3.1...

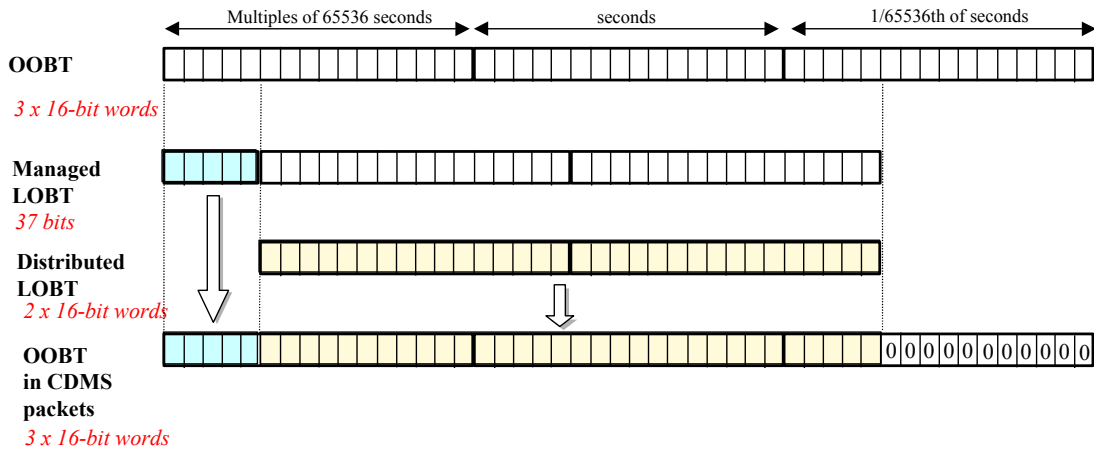


Figure 3.1: Reconstruction of on board time in CDMS packets

- ◆ The ESS groups together several packets and passes them to the Orbiter OBDH, which transmits them according to the Space/Ground interface. This part is transparent for the Lander ground segment.
- ◆ The data are delivered by the Rosetta Data Distribution System (DDS) to the SONC in SFDU format. A SFDU file is basically a collection of 276-byte packets interspersed with auxiliary information records. An 18 bytes SFDU header is added to the CDMS 276-byte packets. This header contains information added at the ground station (time correlated OBT, ground station id, virtual channel id, service channel, type of data, time quality)
- ◆ SONC processes the SFDU files to retrieve the 276-byte packets. This format is available in the SONC database.
- ◆ The relationship between both time formats (OObT and LObT) is given in AD10. Afterwards, SONC processes science raw packets in order to recompose the science measurement (e.g. an image or a spectrum). Figure 3.1 gives an overview of this data flow.

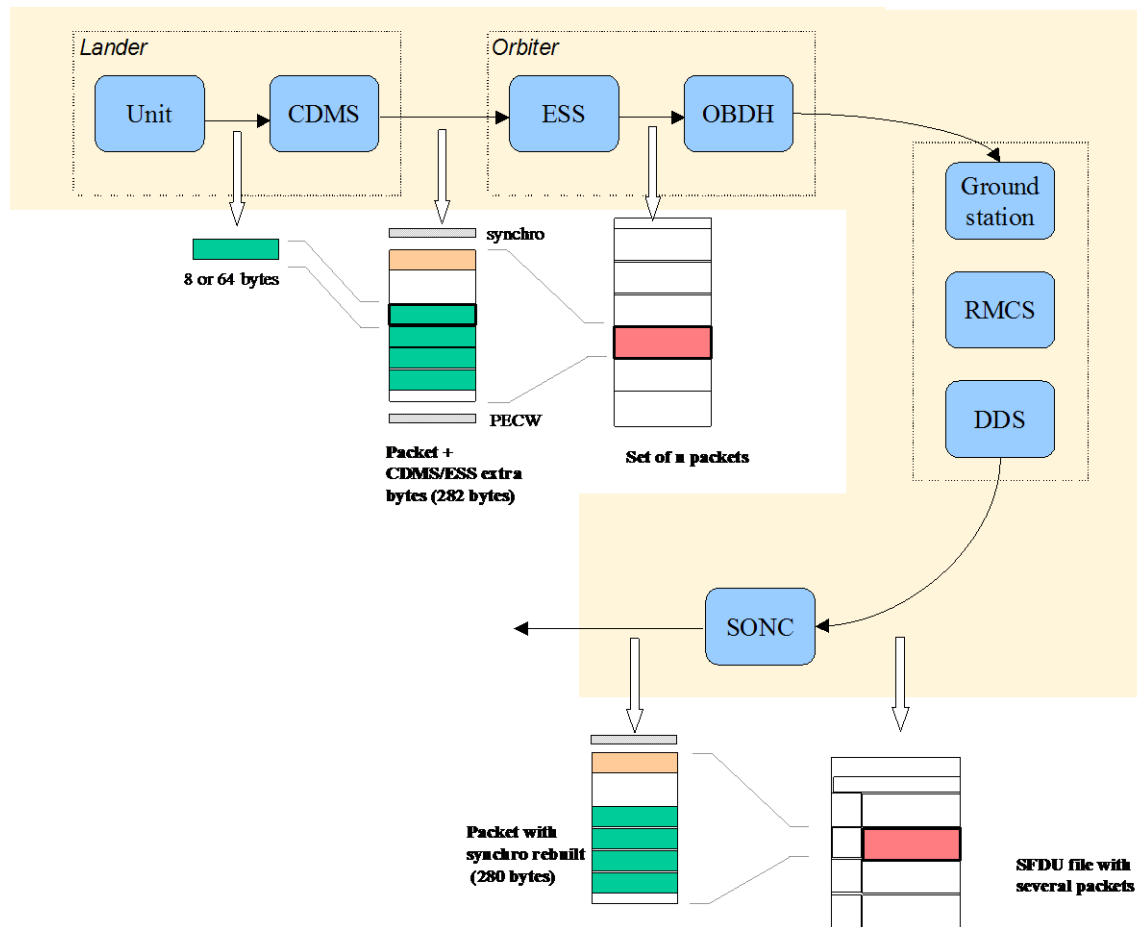


Figure 3.2: On board data flow

The following principles are applied:

- The packet wrapping is removed, and science frames that had to be split into several raw data packets are rebuilt. Basic error detection controls are applied, to recover from possible problems in the transmission chain.
- The Lander On-Board Time (LOBT) (synchronized with OOBT) extracted from the packet, and corresponding UTC time are added.
- UTC time is calculated from the On-Board time taking into account the On-Board clock drift as following:
- $UTC \text{ (seconds since 01/01/1970)} = LOBT \text{ (seconds)} * Gradient + Offset$

These coefficients are extracted from TCP packets delivered by DDS. LOBT is either the LOBT extracted from CDMS header or the experiment internal clock when it exists (CIVA, COSAC, PTOLEMY, ROMAP, ROLIS, SESAME). In the last case, it must be taken into account that the Internal clock (32 bits) resets all 4 years, 4 months, 3 days (first reset at 2007-04-03T10:42:07.000 and second reset at 2011-07-04T21:24:14.000).

UTC time-stamped Science and HK data are available in the SONC database and used to generate PDS format.

### 3.2.2.2 SESAME Time standards

The time standards used in the SESAME data products are:

- SESAME Local Time
- Lander On-Board Time
- DDS header time correlated
- Universal Time Coordinated (UTC)

### SESAME Local Time (SLT)

SESAME Local time is the only common time available to the instruments during operation. It is synchronized with Lander On-board Time each time a CDMS RTIM message is received by SESAME. SESAME uses a timer with a resolution of 1/32 second to update this time between two successive CDMS RTIM messages. The SESAME flight software writes the SESAME Local Time at generation in the measurement header of each science measurement.

#### 3.2.2.3 Lander On-Board Time (LOBT)

The instruments on board the spacecraft (Orbiter) generate telemetry source packets with an OOBT (orbiter on board time) time stamp in the header. The OOBT written into the packet header specifies the time, when CDMS can complete a packet.

In terms of HK packets this is the time of the last HK word. Using the HK scanning rate, which is given in word #9 of the packet, one can calculate the OBT of every individual word in this packet. Note that this is only valid if packets with SID (word #9) 1 or 2 are generated. Packets with SID 4 and 5 are "snapshots", which means you can apply the packet OOBT for every word in this packet. SID 3 packets have to be analyzed case by case.

In terms of SC packets this is the reception of the last 32 word block by CDMS, which also completes the SC packet. How often 32 word blocks are created (and sent) by the unit, and corresponding to this the delta time between each block, might be different for each unit. So, re-calculation of OOBT for SC words depends on this unit feature.

**The Orbiter On-Board Time (OOBT)** is a linear binary counter having a resolution of 1/65536 second stored in 3 16-bit words.

**The Lander On-Board Time (LOBT)** is a linear binary counter having a resolution of 1/32 sec, kept in 37 bits. Only the 32 least significant bits are distributed to the instruments, in 2 16-bit words. The 5 most significant bits are supposed constant during most of the mission; they are available through a specific service.

The LOBT is derived from the Orbiter On-Board Time (OOBT): the 11 least significant bits of the OOBT are discarded to obtain the LOBT, hence the reduced resolution. A re-synchronization between OOBT and LOBT is performed regularly (see AD11).

The Lander is synchronized prior to Separation and during every RF link after landing. So, during descent and the First Science Sequence this should not be a problem, since LOBT keeps synchronized as long as the Lander is powered.

For a description of time handling in the Rosetta project see AD7 "Rosetta Time handling **RO-EST-TN-3165**, issue 1, rev 0, February 9, 2004".

For a description of Lander on board time handling see AD11 (Command and Data Management System (CDMS) Subsystem Specification 29/08/2001, Issue 3, Rev. 5 **RO-LCD-SP-3101**):

§ 2.3.2.6 Synchronization and Adjustment of Lander On-board Time

§ 2.3.2.6.1 Absolute vs. relative time references

§ 2.3.2.6.2 On-board Time Failure Modes and Recovery Procedures

and AD12 (Command and Data Management System (CDMS) Operation Manual 12/02/2001, Issue 1, Rev. 2 **RO-LCD-SW-3402**): § 6. About Lander On-Board Time.

##### 3.2.2.3.1 The DDS header time correlated

The OOBT is converted to UTC (Coordinated Universal Time) by means of time correlation and included in the additional DDS packet header when the packets are distributed via the DDS server.

The **DDS header time correlated** (SCET field in the DDS header) is the UTC of the start of measurement derived from the OOBT by time correlation.

Its format is the Sun Modified Julian Time (MJT) i.e. two 32 bit integers. The first (MSB) contains the number of seconds since 00:00:00 on 1. January 1970 and the second (LSB) integer the number of Microseconds from seconds in the first field.

Time correlation is described in AD13 (Data Delivery Interface Document RO-ESC-IF-5003 Issue B6 23/10/2003, Appendix 18 § 18.1.2.1).

### 3.2.2.3.2 The UTC (Universal Time Coordinated)

The **UTC** is used as a time stamp for SC and HK SESAME data products (from level 2 to level 3).

### 3.2.2.3.3 Spacecraft Clock Count in PDS Labels

The PDS keywords SPACECRAFT\_CLOCK\_START\_COUNT and SPACECRAFT\_CLOCK\_STOP\_COUNT refer to LOBT. The LOBT is represented in the following format: SPACECRAFT\_CLOCK\_START/STOP\_COUNT = "<reset number>/<unit seconds>.<fractional seconds>"

The full stop character separates the unit seconds and the fractional seconds. **Note that this is not a decimal point.** The fractional seconds are expressed as multiples of  $2^{-5} = 0.03125$  seconds and count from 0 to  $2^5 - 1 = 31$ . E.g. in SPACECRAFT\_CLOCK\_START\_COUNT = "3/356281394.21" the 21 fractional seconds correspond to  $21 \times 2^{-5} = 0.65625$  decimal seconds.

The reset number is an integer starting at 1 and defines the epoch related to the counter value. E.g. "1/" means LOBT = 0 at 2003-01-01T00:00:00 UTC. The meaning of the other integer values is defined in the Rosetta time correlation file.

## 3.2.3 Cartographic Systems

SESAME uses Lander reference polar co-ordinates relative to the landing gear orientation. The center of the Landing Gear is the origin with the +X leg acting as reference direction for angle = 0 deg. The rotation angle increases clock-wise. Units are measured in cm and from 0 to 360 deg. As an example: the -Y leg is pointing in the 120 deg direction.

This Lander centric reference system has to be fixed into an appropriate topographic cometary system, in order to indicate external vibration / seismic sources.

Altitude above ground: due to the unscheduled excursion to Abydos and the uncontrolled landing in a region of highly complex topography for which no terrain model is available, the altitude above ground is not known after landing.

## 3.3 Data Validation

The SESAME data products are delivered to PSA by SONC. The SESAME PI or the SESAME PDS responsible will validate the SC and HK data produced by SONC of all PDS CODMAC levels. These data will be distributed via the W3-SONC server.

**3.4 Archive Content**

**3.4.1 Volume Set**

One volume corresponds to one data set. The possible values of VOLUME keywords can be found in AD9. The volume keyword values for the Commissioning mission phase are given in the following example.

```

DESCRIPTION          = "This volume contains Rosetta SESAME
                        level 2 data products and supporting
                        documentation from the
                        Commissioning phase"
VOLUME_ID            = "RLSES2_1042"
VOLUME_NAME          = "SESAME RAW DATA FOR THE COMMISSIONING PHASE"
VOLUME_SERIES_NAME   = "ROSETTA SCIENCE ARCHIVE"
VOLUME_SET_ID        = "DE_DLR_PF_RLSES_10XX"
VOLUME_SET_NAME      = "ROSETTA SESAME DATA"
VOLUME_VERSION_ID    = "VERSION 1"
VOLUMES              = 1
VOLUME_FORMAT        = "ISO-9660"
MEDIUM_TYPE         = "ELECTRONIC"
PUBLICATION_DATE     = YYYY-MM-DD
    
```

**3.4.2 Data Set**

The SESAME data will be archived in Data Sets corresponding to mission phase and data level processing. Data Sets will be named according to chap 3.1.2. Each component of the name will match the corresponding component of the Data Set ID. The data set name components are defined in Table 3.3.

*Table 3.3: Data Set designation parameters*

Name element	Data Set ID	Data Set Name
INSTRUMENT_HOST_ID / INSTRUMENT_HOST_NAME	RL (Rosetta Lander)	ROSETTA-LANDER
Target ID / Target name	See AD9	See AD9
INSTRUMENT_NAME	SESAME – SURFACE ELECTRIC SOUNDING AND ACOUSTIC MONITORING EXPERIMENT	
INSTRUMENT_ID	SESAME	
Data processing level number	Level 1 is delivered directly after the end of the proprietary period and contains level 1 Science and HK data Level 2 is delivered directly after the end of the proprietary period and contains level 2 Science data Level 3 is delivered after the stabilization of the calibration and contains level 3 science and HK data	
Mission phase abbreviation	See AD9	
Description	N/A	N/A
Version	The first version of any Data Set is V1.0	

For mission phases corresponding to Mars and Earth flybys the <description> field of the data set name will contain the name of the operation phase. For example, the operation phases PC#3, PC#4 and PC#5

(payload checkouts) are part of the mission phase “Mars swing-by”. Hence, the name of the SESAME data set containing data from operation phases PC#3, PC#4 and PC#5 would be:

ROSETTA-LANDER MARS SESAME 3 MARS PC#3-4-5 V1.0

### 3.4.3 Directories

The directory structure of SESAME data sets is shown in Figure 3.3. The content of each directory is described in §3.1.3.

#### Level 1 dataset:

```
| -CATALOG-----  
|  
|  
| -DATA-----  
|-root directory-- |  
|  
|  
| -DOCUMENT----  
| -GEOMETRY----  
| -INDEX-----  
| -LABEL-----  
| -SOFTWARE----
```

#### Level 2 and 3 datasets:

```
| -CATALOG-----  
|  
| | | -HC--  
| | | -CASSE-- | -LI--  
| | | | -SN-  
| | | | -TR-  
| | | |  
| | | | -AV--  
| | | | -BC--  
| | | | -CAL-  
| | | | -DIM---- | -HC--  
| | | | | -NT--  
| -DATA----- | | -PC--  
|-root directory-- | | -ST--  
| | | |  
| | | | -AM--  
| | | | -PP----- | -HC--  
| | | | | -LM--  
| | | | | -PM--  
| | | | |  
| | | | -SESAME- | -HK--  
| | | | | -SC--  
| | | | |  
| -DOCUMENT----  
| -GEOMETRY----  
| -INDEX-----  
| -LABEL-----  
| -SOFTWARE----
```

Figure 3.3: SESAME PDS directory structure

### 3.4.3.1 Root Directory

Files in the Root Directory include an overview of the archive, i.e. a description of the volume for the PDS Catalog. The files in the Root Directory are given in Table 3.4.

*Table 3.4: Files in the Root Directory*

File Name	File Contents
AAREADME.TXT	Volume content and format information
VOLDESC.CAT	A description of the contents of this volume in a PDS format readable by both humans and computers

### 3.4.3.2 Calibration Directory

There are no calibration files provided in the calibration directory. However, the information needed for transfer from level 2 to level 3 data is provided, for each instrument, in the following files (DOCUMENT directory).

CASSE: CALIBRATION\_DESC\_CAS.TXT  
 DIM : CALIBRATION\_DESC\_DIM.TXT  
 PP: CALIBRATION\_DESC\_PP.TXT

### 3.4.3.3 Catalog Directory

The files in the Catalog Directory provide a top-level understanding of the mission, spacecraft, instruments, and data sets. The files in this directory are coordinated with the PSA team, who is responsible for loading them into the PDS catalog. The following files are found in the Catalog Directory.

*Table 3.5: Files in the Catalog Directory*

File Name	File Contents
CATINFO.TXT	A description of the contents of this directory
DATASET.CAT	Data Set description, one for each Data Set
INSTHOST.CAT	Instrument host (spacecraft) description, provided by the Project
INST.CAT	SESAME instruments description (CASSE, DIM and PP)
MISSION.CAT	Mission description, provided by the Project
PERSON.CAT	PDS personnel catalog information about the instrument team responsible for generating the data products.
REF.CAT	Full citations for references mentioned in any and all of the catalog files, or in any associated label files
SOFTWARE.CAT	Information about the software included in the SOFTWARE directory

### 3.4.3.4 Data Directory

DATA directory contains the subdirectories SESAME, CASSE, DIM and PP for SESAME housekeeping and the respective sensor data. Inside these subdirectories the data are organized by observation type. For naming convention, see chapter 3.1.3.

### 3.4.3.5 Document Directory

The DOCUMENT directory contains SESAME documentation listed in Table 3.6



*Table 3.6 Files in document directory*

File Name	File Contents
DOCINFO.TXT	A description of the contents of this directory
EAICD_SESAM.E.PDF	The SESAME Experiment Archive Interface Control Document (this document) as a PDF file
EAICD_SESAM.E.LBL	A PDS detached label for EAICD_SESAM.E.PDF
LSE-SW-FM1-UM.PDF	AD1 SESAME Flight Software User Manual, FM1
LSE-SW-FM1-UM.LBL	PDS label for LSE-SW-FM1-UM.PDF
LSE-SW-FM2-UM.PDF	AD2 SESAME Flight Software User Manual, FM2
LSE-SW-FM2-UM.LBL	PDS label for LSE-SW-FM2-UM.PDF
LSE-SW-FM3-TCTM.PDF	AD3 SESAME Flight Software User Manual, FM3
LSE-SW-FM3-TCTM.LBL	PDS label for LSE-SW-FM3-TCTM.PDF
RL_SESAM.E_LOGBOOK.ASC	SESAME operations logbook
RL_SESAM.E_LOGBOOK.LBL	PDS label for RL_SESAM.E_LOGBOOK.ASC
RO-LSE-TN-3101.PDF	The instrument link-up of Rosetta Some SESAME lessons learned
RO-LSE-TN-3101.LBL	PDS label for RO-LSE-TN-3101.PDF
RO-LSE-TN-3102.PDF	OPERATING SESAME: LESSONS LEARNED
RO-LSE-TN-3102.LBL	PDS label for RO-LSE-TN-3102.PDF
SES_CAS_CALIBRATION_DESC.TXT	Description of CASSE calibration the transfer from level 2 to level 3
SES_CAS_CALIBRATION_DESC.LBL	PDS label for SES_CAS_CALIBRATION_DESC.TXT
SES_DIM_CALIBRATION_DESC.TXT	Description of DIM calibration the transfer from level 2 to level 3
SES_DIM_CALIBRATION_DESC.LBL	PDS label for SES_DIM_CALIBRATION_DESC.TXT
SES_PP_CALIBRATION_DESC.TXT	Description of PP calibration transfer from level 2 to level 3
SES_PP_CALIBRATION_DESC.LBL	PDS label for SES_PP_CALIBRATION_DESC.TXT

### 3.4.3.6 Index Directory

Files in the Index Directory are provided to help the user locate products on this archive volume and on previously released volumes in the archive. The following files are contained in the Index Directory.

*Table 3.7: Files in the Index Directory*

File Name	File Contents
INDXINFO.TXT	A description of the contents of this directory
INDEX.TAB	A tabular listing all data products on this volume
INDEX.LBL	A PDS detached label that describes INDEX.TAB

### 3.4.3.7 Software Directory

There is no software provided in the SOFTWARE directory.

### 3.4.3.8 Label Directory

The LABEL directory contains format container files (see

Table 3.8) used by SESAME labels.

*Table 3.8: Files for levels 2 and 3 in the Label Directory.  
 The flight software versions are named FM1, FM2, FM3 and the CODMAC levels are named L2, L3.*

File Name	File Contents
CAS_JOB_CARD.FMT	Data objects definitions for CASSE jobcard products (FM1, FM2, L2, L3)
CAS_JOB_CARD_FM3.FMT	Data objects definitions for CASSE jobcard products (FM3, L2, L3)
CAS_SEQ_PARAM_BURST2.FMT	Data objects definitions for CASSE sequence parameters products in burst mode (FM1, FM2, L2)
CAS_SEQ_PARAM_BURST3.FMT	Data objects definitions for CASSE sequence parameters products in burst mode (FM1, FM2, L3)
CAS_SEQ_PARAM_TRIG2.FMT	Data objects definitions for CASSE sequence parameters products in triggered mode (FM1, FM2, L2)
CAS_SEQ_PARAM_TRIG3.FMT	Data objects definitions for CASSE sequence parameters products in triggered mode (FM1, FM2, L3)
CAS_SEQ_PARAM_BURST2_FM3.FMT	Data objects definitions for CASSE sequence parameters products in burst mode (FM3, L2)
CAS_SEQ_PARAM_BURST3_FM3.FMT	Data objects definitions for CASSE sequence parameters products in burst mode (FM3, L3)
CAS_SEQ_PARAM_TRIG2_FM3.FMT	Data objects definitions for CASSE sequence parameters products in triggered mode (FM3, L2)
CAS_SEQ_PARAM_TRIG3_FM3.FMT	Data objects definitions for CASSE sequence parameters products in triggered mode (FM3, L3)
CAS_DATA2.FMT	Data objects definitions for CASSE data products (FM1, FM2, FM3, L2)
CAS_DATA3.FMT	Data objects definitions for CASSE data products (FM1, FM2, FM3, L3)
CAS_TAFT3.FMT	Data objects definitions for CASSE temperatures after measurement products (FM1, FM2, L3)
CAS_TAFT2_FM3.FMT	Data objects definitions for CASSE temperatures after measurement products (FM3, L2)
CAS_TAFT3_FM3.FMT	Data objects definitions for CASSE temperatures after measurement products (FM3, L3)
CAS_STAT2_FM3.FMT	Statistics block (FM3, L2 and L3)
DIM_BC_AM.FMT	Data objects definitions for DIM Burst Continuous Average Mode products (FM1, FM2, FM3)
DIM_BC_BM.FMT	Data objects definitions for DIM Burst Continuous Burst Mode products (FM1, FM2, FM3)
DIM_BC_BM_FM1.FMT	Data objects definitions for DIM Burst Continuous Burst Mode products (FM1)
DIM_BC_PAR.FMT	Data objects definitions for DIM Burst Continuous Parameters products (FM1, FM2, FM3)
DIM_BCTEST2_SIG_FM3.FMT	Burst Continuous Test 2 (FM3)
DIM_BCTEST2_PAR_FM3.FMT	Data objects definitions for DIM Burst Continuous Test 2 Parameters products (FM3)
DIM_CA.FMT	Data objects definitions for DIM Health Check Calibration products (FM1, FM2, FM3)
DIM_NT.FMT	Data objects definitions for DIM Health Check Noise Test products (FM1, FM2, FM3)
DIM_PC.FMT	Data objects definitions for DIM Health Check Power Check products (FM1, FM2, FM3)
DIM_ST.FMT	Data objects definitions for DIM Health Check Sensor Test products (FM1, FM2, FM3)
PP_AM2_DATA.FMT	Data objects definitions for PP Active Mode products (FM2, FM3)

File Name	File Contents
PP_AM2_PAR.FMT	Data objects definitions for PP Active Mode Parameters products (FM2, FM3)
PP_AMT_DAC.FMT	Data objects definitions for PP Active Mode Test DAC products (FM1, FM2, FM3)
PP_AMT_PAR.FMT	Calibrated data objects definitions for PP Active Mode Test Parameters products (FM1)
PP_AMT_PARC.FMT	Data objects definitions for PP Active Mode Test Parameters products (FM1)
PP_AMT2_PAR.FMT	Data objects definitions for PP Active Mode Test 2 Parameters products (FM2, FM3)
PP_AMT2_PARC.FMT	Calibrated data objects definitions for PP Active Mode Test 2 Parameters products (FM2, FM3)
PP_AMT_RX.FMT	Data objects definitions for PP Active Mode Test RX products (FM1, FM2, FM3)
PP_AMT_TX.FMT	Data objects definitions for PP Active Mode Test TX products (FM1, FM2, FM3)
PP_HC.FMT	Data objects definitions for PP Health Check products (FM1, FM2, FM3)
PP_PM2_PAR.FMT	Data objects definitions for PP Passive Mode Parameters products (FM2, FM3)
PP_PM2_POW.FMT	Data objects definitions for PP Passive Mode Power spectrum products (FM2, FM3)
PP_PMT2_POW.FMT	Data objects definitions for PP Passive Mode Test 2 Power spectrum products (FM2, FM3)
PP_PMT2_POWC.FMT	Data objects definitions for PP Passive Mode Test 2 Power spectrum products (FM2, FM3)
PP_PMT2_PAR.FMT	Data objects definitions for PP Passive Mode Test Parameter products (FM2, FM3)
PP_PMT_RX.FMT	Data objects definitions for PP Passive Mode Test RX products (FM1, FM2, FM3)
PP_AM2_PARC.FMT	Calibrated data objects definitions for PP Active Mode parameters (FM2, FM3)
PP_AM2_DATAAC.FMT	Calibrated data objects definitions for PP Active Mode products (FM2, FM3)
PP_AMT_TXC.FMT	Calibrated data objects definitions for PP Active Mode Test TX products (FM1, FM2, FM3)
PP_AMT_RXC.FMT	Calibrated data objects definitions for PP Active Mode Test RX products (FM1, FM2, FM3)
PP_AMT_DACC	Calibrated data objects for PP Active Mode DAC values (FM1, FM2, FM3)
PP_PM2_PARC.FMT	Calibrated data objects definitions for PP Passive Mode Parameters products (FM2, FM3)
PP_PM2_POW.FMT	Calibrated data objects definitions for PP Passive Mode Power spectrum products (FM2, FM3)
PP_PMT2_PARC.FMT	Calibrated data objects definitions for PP Passive Test Mode Parameters products (FM2, FM3)
PP_PMT2_RXC.FMT	Calibrated data objects definitions for PP Passive Mode Test RX products (FM2, FM3)
PP_HCC.FMT	Calibrated data objects definitions for PP Health Check (FM1, FM2, FM3)
SESAME_EMES.FMT	Data objects definitions for common SESAME products: error messages
SESAME_HK.FMT	Data objects definitions for common SESAME products: housekeeping
SESAME_HK_FM3.FMT	Data objects definitions for common SESAME products: housekeeping (FM3)
SESAME_HC.FMT	Data objects definitions for common SESAME products:

File Name	File Contents
	health check
SESAME_HC_FM3.FMT	Data objects definitions for common SESAME products: health check (FM3)
SESAME_RBUF.FMT	Data objects definitions for common SESAME products: read backup RAM buffer
SESAME_RDJC.FMT	Data objects definitions for common SESAME products: read stored TC buffer
SESAME_RMES.FMT	Data objects definitions for common SESAME products: Ready Message (FM1, FM2, FM3)

## 4 Detailed Interface Specifications

This chapter gives detailed information on the dataset, directory and file naming of the SESAME archive design at instrument and detector/sensor level.

### 4.1 Structure and Organization Overview

The SESAME data files will be archived in a data set on the basis of the mission phase relative to the production of the data.

Each .ROL (rolbin) file containing the raw data (telemetry packets, CODMAC level 1) will be placed in the DATA directory of the corresponding dataset (with level 1 data files, HK and SC mixed).

Each .TAB file containing uncalibrated SC data (CODMAC level 2) will be archived in the DATA directory of the corresponding dataset (with level 2 SC data files).

Each .TAB file containing calibrated SC data (CODMAC level 3) and each .CSV file containing calibrated HK (CODMAC level 3) data will be archived in the DATA directory of the corresponding datasets (with level 3 HK data files and level 3 SC data files).

The file names and directories names follow the rules explained in this document (chap 3.1.4 and 3.1.3).

### 4.2 Data Sets, Definition and Content

The Table 4.1 gives the definition of the name and ID of the SESAME data sets.

Table 4.1: Name and ID of SESAME data sets

Data Set ID	Data Set Name
RL-CAL-SESAME-1-CVP1-V1.0	ROSETTA-LANDER CAL SESAME 1 CVP1 V1.0
RL-CAL-SESAME-1-CVP2-V1.0	ROSETTA-LANDER CAL SESAME 1 CVP2 V1.0
RL-CAL-SESAME-1-CR2-V1.0	ROSETTA-LANDER CAL SESAME 1 CR2 V1.0
RL-CAL-SESAME-1-CR4A-V1.0	ROSETTA-LANDER CAL SESAME 1 CR4A V1.0
RL-CAL-SESAME-1-CR4B-V1.0	ROSETTA-LANDER CAL SESAME 1 CR4B V1.0
RL-CAL-SESAME-1-CR5-V1.0	ROSETTA-LANDER CAL SESAME 1 CR5 V1.0
RL-E-SESAME-1-EAR1-V1.0	ROSETTA-LANDER EARTH SESAME 1 EAR1 V1.0
RL-E-SESAME-1-EAR2-V1.0	ROSETTA-LANDER EARTH SESAME 1 EAR2 V1.0
RL-E-SESAME-1-EAR3-V1.0	ROSETTA-LANDER EARTH SESAME 1 EAR3 V1.0
RL-M-SESAME-1-MARS-V1.0	ROSETTA-LANDER MARS SESAME 1 MARS V1.0
RL-A-SESAME-1-AST1-V1.0	ROSETTA-LANDER STEINS SESAME 1 AST1 V1.0
RL-CAL-SESAME-1-RVM1-V1.0	ROSETTA-LANDER CAL SESAME 1 RVM1 V1.0
RL-CAL-SESAME-1-PHC-V1.0	ROSETTA-LANDER CAL SESAME 1 PHC V1.0
RL-CAL-SESAME-1-PDCS-V1.0	ROSETTA-LANDER CAL SESAME 1 PDCS V1.0
RL-C-SESAME-1-SDL-V1.0	ROSETTA-LANDER 67P SESAME 1 SDL V1.0
RL-C-SESAME-1-FSS-V1.0	ROSETTA-LANDER 67P SESAME 1 FSS V1.0
RL-CAL-SESAME-2-CVP1-V1.0	ROSETTA-LANDER CAL SESAME 2 CVP1 V1.0
RL-CAL-SESAME-2-CVP2-V1.0	ROSETTA-LANDER CAL SESAME 2 CVP2 V1.0
RL-CAL-SESAME-2-CR2-V1.0	ROSETTA-LANDER CAL SESAME 2 CR2 V1.0
RL-CAL-SESAME-2-CR4A-V1.0	ROSETTA-LANDER CAL SESAME 2 CR4A V1.0
RL-CAL-SESAME-2-CR4B-V1.0	ROSETTA-LANDER CAL SESAME 2 CR4B V1.0
RL-CAL-SESAME-2-CR5-V1.0	ROSETTA-LANDER CAL SESAME 2 CR5 V1.0
RL-E-SESAME-2-EAR1-V1.0	ROSETTA-LANDER EARTH SESAME 2 EAR1 V1.0
RL-E-SESAME-2-EAR2-V1.0	ROSETTA-LANDER EARTH SESAME 2 EAR2 V1.0

Data Set ID	Data Set Name
RL-E-SESAME-2-EAR3-V1.0	ROSETTA-LANDER EARTH SESAME 2 EAR3 V1.0
RL-M-SESAME-2-MARS-V1.0	ROSETTA-LANDER MARS SESAME 2 MARS V1.0
RL-A-SESAME-2-AST1-V1.0	ROSETTA-LANDER STEINS SESAME 2 AST1 V1.0
RL-CAL-SESAME-2-RVM1-V1.0	ROSETTA-LANDER CAL SESAME 2 RVM1 V1.0
RL-CAL-SESAME-2-PHC-V1.0	ROSETTA-LANDER CAL SESAME 2 PHC V1.0
RL-CAL-SESAME-2-PDCS-V1.0	ROSETTA-LANDER CAL SESAME 2 PDCS V1.0
RL-C-SESAME-2-SDL-V1.0	ROSETTA-LANDER 67P SESAME 2 SDL V1.0
RL-C-SESAME-2-FSS-V1.0	ROSETTA-LANDER 67P SESAME 2 FSS V1.0
RL-CAL-SESAME-3-CVP1-V1.0	ROSETTA-LANDER CAL SESAME 3 CVP1 V1.0
RL-CAL-SESAME-3-CVP2-V1.0	ROSETTA-LANDER CAL SESAME 3 CVP2 V1.0
RL-CAL-SESAME-3-CR2-V1.0	ROSETTA-LANDER CAL SESAME 3 CR2 V1.0
RL-CAL-SESAME-3-CR4A-V1.0	ROSETTA-LANDER CAL SESAME 3 CR4A V1.0
RL-CAL-SESAME-3-CR4B-V1.0	ROSETTA-LANDER CAL SESAME 3 CR4B V1.0
RL-CAL-SESAME-3-CR5-V1.0	ROSETTA-LANDER CAL SESAME 3 CR5 V1.0
RL-E-SESAME-3-EAR1-V1.0	ROSETTA-LANDER EARTH SESAME 3 EAR1 V1.0
RL-E-SESAME-3-EAR2-V1.0	ROSETTA-LANDER EARTH SESAME 3 EAR2 V1.0
RL-E-SESAME-3-EAR3-V1.0	ROSETTA-LANDER EARTH SESAME 3 EAR3 V1.0
RL-M-SESAME-3-MARS-V1.0	ROSETTA-LANDER MARS SESAME 3 MARS V1.0
RL-A-SESAME-3-AST1-V1.0	ROSETTA-LANDER STEINS SESAME 3 AST1 V1.0
RL-CAL-SESAME-3-RVM1-V1.0	ROSETTA-LANDER CAL SESAME 3 RVM1 V1.0
RL-CAL-SESAME-3-PHC-V1.0	ROSETTA-LANDER CAL SESAME 3 PHC V1.0
RL-CAL-SESAME-3-PDCS-V1.0	ROSETTA-LANDER CAL SESAME 3 PDCS V1.0
RL-C-SESAME-3-SDL-V1.0	ROSETTA-LANDER 67P SESAME 3 SDL V1.0
RL-C-SESAME-3-FSS-V1.0	ROSETTA-LANDER 67P SESAME 3 FSS V1.0

### 4.3 Data Product Design

SESAME data products have PDS detached labels. Some of them have combined detached labels. Details are given in the following chapters.

#### 4.3.1 SESAME raw data product (Level 1)

Level 1 contains mixed raw housekeeping and science data packets delivered by the Rosetta Lander with detached PDS labels.

##### 4.3.1.1 File Characteristics Data Elements

PDS minimal detached labels describe the raw files (level 1). The file characteristic data elements are RECORD\_TYPE, PRODUCT\_TYPE and FILE\_NAME. The PRODUCT\_TYPE is UDR. The RECORD\_TYPE for raw data is UNDEFINED, i.e. the structure of records is not described in the PDS labels since these data are intended to be processed with the EGSE software. The file contains telemetry packets, which are described in AD1.

##### 4.3.1.2 Instrument and Detector Descriptive Data Elements

```

INSTRUMENT_HOST_NAME = "ROSETTA-LANDER"
INSTRUMENT_HOST_ID   = RL
INSTRUMENT_ID        = SESAME
INSTRUMENT_NAME       = "SURFACE ELECTRIC SOUNDING AND ACOUSTIC
                        MONITORING EXPERIMENT"
INSTRUMENT_TYPE      = {"ACOUSTIC SENSOR", "DUST IMPACT DETECTOR",

```

"PERMITTIVITY PROBE" }

### 4.3.1.3 Description of Instrument

The description of the instrument is done in above and as a brief overview in the INST.CAT catalog file.

### 4.3.1.4 Data quality definition (level 1)

The data quality is defined (in the label) by the DATA\_QUALITY\_ID keyword.

The criterion is the data loss (missing data or damaged data (zero packets)) by telemetry system compared to expected amount.

The DATA\_QUALITY\_ID scheme is described by the associated DATA\_QUALITY\_DESC element as follows:

```
DATA_QUALITY_DESC = -1: NOT QUALIFIED
                  0: Data complete, 0% telemetry loss
                  1: data loss < 5%
                  2: 5% ≤ data loss < 10%
                  3: 10% ≤ data loss < 20%
                  4: data loss ≥ 20%
```

### 4.3.2 SESAME science level 2 data product design

Level 2 contains raw (uncalibrated) CASSE and PP time series and DIM tables. The level 2 products have PDS detached labels and combined detached labels.

The SESAME subdirectory contains calibrated housekeeping (HK) and health check data all with the appropriate time-stamp.

#### 4.3.2.1 File Characteristics Data Elements

PDS data product **labels** contain data element information that describes important attributes of the physical structure of a data product file. The PDS file characteristic data elements for SEAME science level 2 data are:

```
RECORD_TYPE = FIXED_LENGTH
RECORD_BYTES = ...
FILE_RECORDS = ...
```

The RECORD\_TYPE data element identifies the record characteristics of the data product file. Physical records are always fixed-length. The RECORD\_BYTES data element identifies the number of bytes in each physical record in the data product file. The FILE\_RECORDS data element identifies the number of physical records in the file.

#### 4.3.2.2 Data Object Pointers Identification Data Elements

The SESAME data have combined detached labels. A single PDS detached data product label file is used to describe the contents of more than one data product file (the products belong to the same working session of a SESAME instrument). The combined detached label contains pointers to individual data products. The labels refer to FILE objects.

#### 4.3.2.3 Instrument and Detector Descriptive Data Elements

The following data identification elements provide additional information about the SESAME data product.

```
INSTRUMENT_HOST_NAME = "ROSETTA LANDER"
INSTRUMENT_HOST_ID = RL
INSTRUMENT_ID = SESAME
INSTRUMENT_NAME = "SURFACE ELECTRIC SOUNDING AND ACOUSTIC
                  MONITORING EXPERIMENT"
INSTRUMENT_TYPE = {"ACCELEROMETER", "DUST IMPACT DETECTOR",
                  "PERMITTIVITY PROBE", "UNK"}
FLIGHT_SOFTWARE_VERSION_ID =
CHANNELS =
```



#### 4.3.2.4 Data Object Definition

There are 14 scientific data products defined for SESAME according to the instrument modes (see §3.1.3 and Table 3.2) and flight software version.

##### 4.3.2.4.1 CASSE Data object definition

The CASSE data are organized as tables with 24 columns containing 12 times and 12 channel values (accelerometers or transmitters): time 1 channel1 time2 channel2 ... time 12 channel12.

The association of the above channel numbers with physical channels of the accelerometers, e.g. which channel number corresponds to the x-channel of the accelerometer in the +Y foot, is not fixed. Channels are always read in the same order by the multiplexer, but in Trigger Mode the flight software has no means to identify which channel was read last when the recording starts. The procedure to associate channel numbers (and thus the columns of the archived data files) to physical channels is given in [AD3].

The « Job cards » and « sequence parameters » are kept in separated files (combined detached labels).

The structures of CASSE measurements differ according to flight software version. The details concerning the telemetry formats can be found in [AD1] for flight software version 1, in [AD2] for flight software version 2 and in [AD3] for flight software version 3. The FM2 software was uploaded on 2007-09-24 at 19h40 UTC (during payload checkout #6). The FM3 software was uploaded on 2009-09-24 at 02h00 UTC (during PC#10).

Examples:

CASSE sounding, FM2, level 2 (1 label file pointing to 4 data files)

**SES\_FS2\_CSN\_0510040300.LBL** (label)  
 SES\_FS2\_CSN\_0510040300\_JOB.C.TAB (parameters of jobcard, described in  
 CAS\_JOB.CARD.FMT)  
 SES\_FS2\_CSN\_0510040300\_SEQ.P.TAB (sequence parameters, described in  
 CAS\_SEQ\_PARAM\_BURST\_L2.FMT for BURST mode  
 or  
 CAS\_SEQ\_PARAM\_TRIG2 for TRIGGER mode)  
 SES\_FS2\_CSN\_0510040300\_DATA.TAB (data, ACC or TX described in  
 CAS\_DATA\_L2.FMT)  
 SES\_FS2\_CSN\_0510040300\_TAFT.TAB (foot temperatures, described in  
 CAS\_TAFT\_L2.FMT)

CASSE sounding, FM3, level 2 (1 label file pointing to 5 data files)

**SES\_FS2\_CSN\_0510040300.LBL** (label)  
 SES\_FS2\_CSN\_0510040300\_JOB.C.TAB (parameters of jobcard, described in  
 CAS\_JOB.CARD\_FM3.FMT)  
 SES\_FS2\_CSN\_0510040300\_SEQ.P.TAB (sequence parameters, described in  
 CAS\_SEQ\_PARAM\_BURST\_L2\_FM3.FMT for BURST mode or  
 CAS\_SEQ\_PARAM\_TRIG2\_FM3 for TRIGGER mode)  
 SES\_FS2\_CSN\_0510040300\_DATA.TAB (data, ACC or TX described in  
 CAS\_DATA\_L2.FMT or  
 CAS\_DATA\_STACKED\_L2.FMT for STACKING mode)  
 SES\_FS2\_CSN\_0510040300\_TAFT.TAB (foot temperatures, described in  
 CAS\_TAFT\_L2\_FM3.FMT)  
 SES\_FS2\_CSN\_0510040300\_STAT.TAB (measurement statistics described in  
 CAS\_STAT\_FM3.FMT)

The label contains the start and stop times as LOBT and UTC. The data files contain time in ms relative to the start time.

### 4.3.2.4.1.1 Flight software versions FM1 and FM2

#### 4.3.2.4.1.1.1 CASSE Jobcard definition

A TABLE object describes the jobcard.

```

OBJECT          = JOBC_TABLE
  NAME          = "JOB_CARD"
  INTERCHANGE_FORMAT = ASCII
  ROWS          = 1
  COLUMNS     = 29
  ROW_BYTES    = 176
  ^STRUCTURE   = "CAS_JOB_CARD_FM3.FMT"
END_OBJECT     = JOBC_TABLE
  
```

The structure of the TABLE object is defined in the file CAS\_JOB\_CARD.FMT.

```

OBJECT          = COLUMN
  NAME          = "SESAME_SEQ_ID"
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 1
  BYTES        = 6
  FORMAT       = "I6"
  UNIT         = "N/A"
  DESCRIPTION   = "Sequence ID in the current data file"
END_OBJECT     = COLUMN
  
```

```

OBJECT          = COLUMN
  NAME          = "JOB_ID"
  DATA_TYPE    = CHARACTER
  START_BYTE    = 9
  BYTES        = 2
  FORMAT       = "A2"
  UNIT         = "N/A"
  DESCRIPTION   = "Jobcard identifier (hex value)"
END_OBJECT     = COLUMN
  
```

```

OBJECT          = COLUMN
  NAME          = "SAVE_FULL"
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 13
  BYTES        = 1
  FORMAT       = "I1"
  UNIT         = "N/A"
  DESCRIPTION   = "Possible values :
                    0 : Save ID Only
                    1 : Save Full"
END_OBJECT     = COLUMN
  
```

```

OBJECT          = COLUMN
  NAME          = "MORE_JOBS"
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 15
  BYTES        = 1
  
```

FORMAT = "I1"  
UNIT = "N/A"  
DESCRIPTION = "Possible values :  
0 : Last Job  
1 : More Jobs"

END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "SUB\_ID"  
DATA\_TYPE = CHARACTER  
START\_BYTE = 18  
BYTES = 2  
FORMAT = "A2"  
UNIT = "N/A"  
DESCRIPTION = "Hex value"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "START\_CONDITION"  
DATA\_TYPE = CHARACTER  
START\_BYTE = 23  
BYTES = 2  
FORMAT = "A2"  
UNIT = "N/A"  
DESCRIPTION = "Hex value"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "REPETITIONS"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 27  
BYTES = 3  
FORMAT = "I3"  
UNIT = "N/A"  
DESCRIPTION = " Number of repetitions"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "SOUND\_FREQ"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 31  
BYTES = 5  
FORMAT = "I5"  
UNIT = "HERTZ"  
DESCRIPTION = " transmitter sound frequency"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "SND\_DURATION"  
DATA\_TYPE = ASCII\_REAL  
START\_BYTE = 37  
BYTES = 9  
FORMAT = "F9.1"

```
UNIT = "MILLISECOND"
MISSING_CONSTANT = 9999999.9
DESCRIPTION = "Sounding duration in sounding mode"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "TRIGGER_TIMEOUT"
DATA_TYPE = ASCII_INTEGER
START_BYTE = 47
BYTES = 5
FORMAT = "I5"
UNIT = "SECOND"
MISSING_CONSTANT = 99999
DESCRIPTION = "Time-out duration, after which listening stops
if no trigger signal occurred"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "SAMPLING_FREQ"
DATA_TYPE = ASCII_INTEGER
START_BYTE = 53
BYTES = 6
FORMAT = "I6"
UNIT = "HERTZ"
DESCRIPTION = "Sampling frequency per channel"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "TX_STATUS"
DATA_TYPE = CHARACTER
START_BYTE = 61
BYTES = 5
FORMAT = "A5"
UNIT = "N/A"
DESCRIPTION = "Selection of transmitters to be used in
Sounding Mode. If TX_cycle is set, after a
measurement the transmitter selection is
(cyclically) shifted by one position up to
yield the transmitters to be used for the next
measurement. If Tx_reverse is additionally set,
the selection of active transmitters is shifted
one position downwards instead.
Bit field represented as 5 characters, the rightmost
character corresponds to bit #0 and the leftmost to
bit #4.
Each character can be 1 (active sensor or cycle on or
reversed on) or 0 (sensor not used) and have the
following meaning.
bit 0: TRM -Y
bit 1: TRM +X
bit 2: TRM +Y
bit 3: TX_cycle
bit 4: TX_reverse "
```

END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "AGC"  
DATA\_TYPE = CHARACTER  
START\_BYTE = 69  
BYTES = 2  
FORMAT = "A2"  
UNIT = "N/A"  
DESCRIPTION = "Amplification gain selection in hexadecimal format  
Value to be written to the Amplifier Gain  
Control register of CASSE electronics. Decimal value  
ranges from 0 (maximal gain) to 15 (minimal gain).  
Note (a) the gain is not a monotone function of the  
AGC value, (b) the actually adjusted gain can  
deviate, if automatic gain setting (AGS) is enabled."

END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "TRIGGER\_SRC"  
DATA\_TYPE = CHARACTER  
START\_BYTE = 74  
BYTES = 13  
FORMAT = "A13"  
UNIT = "N/A"  
DESCRIPTION = "Subset of active sensor channels used as trigger  
sources. Bit field represented as 12 characters,  
the rightmost character corresponds to bit #0  
and the leftmost to bit #11.  
Each character can be 1 (active sensor used as a  
trigger source) or 0 (sensor not used as a trigger  
source) and have the following meaning.  
bit 0: ACC -Y, x-axis  
bit 1: ACC -Y, y-axis  
bit 2: ACC -Y, z-axis  
bit 3: ACC +X, x-axis  
bit 4: ACC +X, y-axis  
bit 5: ACC +X, z-axis  
bit 6: ACC +Y, x-axis  
bit 7: ACC +Y, y-axis  
bit 8: ACC +Y, z-axis  
bit 9: TRM -Y  
bit 10: TRM +X  
bit 11: TRM +Y  
bit 12: AUTO RANGE"

END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "TRIGGER\_DELAY"  
DATA\_TYPE = ASCII\_REAL  
START\_BYTE = 89  
BYTES = 9  
FORMAT = "F9.1"

```
UNIT = "MILLISECOND"
DESCRIPTION = " Determines the time range before (negative
                value) or after (positive value) a trigger
                event, which shall be included in the time series.
                Absolute value of TrgDelay must be less or equal
                LIS_DURATION."
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "TRIGGER_LEVEL_POS"
DATA_TYPE = ASCII_INTEGER
START_BYTE = 99
BYTES = 4
FORMAT = "I4"
UNIT = "N/A"
DESCRIPTION = "Positive trigger level.
                Value to be written to the UTT hardware register,
                which fixes the upper (always positive) trigger
                threshold. Note that the actually adjusted value
                can be different, if automatic trigger level setting
                is enabled."
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "TRIGGER_LEVEL_NEG"
DATA_TYPE = ASCII_INTEGER
START_BYTE = 104
BYTES = 4
FORMAT = "I4"
UNIT = "N/A"
DESCRIPTION = "Negative trigger level.
                Value to be written to the LTT hardware register,
                which fixes the lower (always negative) trigger
                threshold. Note that the actually adjusted value
                can be different, if automatic trigger level setting
                is enabled."
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "RX_DURATION"
DATA_TYPE = ASCII_REAL
START_BYTE = 109
BYTES = 9
FORMAT = "F9.1"
UNIT = "MILLISECOND"
DESCRIPTION = "Measurement duration "
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "RX_STATUS"
DATA_TYPE = CHARACTER
START_BYTE = 120
BYTES = 16
```

```
FORMAT          = "A16"
UNIT            = "N/A"
DESCRIPTION     = "Selection of sensor channels to be used. If cycle
                    is set, after a measurement the receiver selection
                    is (cyclically) shifted by one position (in the same
                    direction as the transmitters, as indicated in
                    TX_STATUS. If the reversed flag is additionally set,
                    the receiver cycling shall take place in the opposite
                    direction as the transmitter cycling.
                    Bit field represented as 15 characters, the rightmost
                    character corresponds to bit #0 and the leftmost to
                    bit #13.
                    Each character can be 1 (active sensor or cycle on or
                    reversed on) or 0 (sensor not used) and have the
                    following meaning.
                    bit  0: ACC -Y, x-axis
                    bit  1: ACC -Y, y-axis
                    bit  2: ACC -Y, z-axis
                    bit  3: ACC +X, x-axis
                    bit  4: ACC +X, y-axis
                    bit  5: ACC +X, z-axis
                    bit  6: ACC +Y, x-axis
                    bit  7: ACC +Y, y-axis
                    bit  8: ACC +Y, z-axis
                    bit  9: TRM -Y
                    bit 10: TRM +X
                    bit 11: TRM +Y
                    bit 12: cycle
                    bit 13: sort

                    bit 14 : reversed
                    bit 15 : custom seq "
```

```
END_OBJECT      = COLUMN

OBJECT          = COLUMN
NAME            = "GPW1"
DATA_TYPE       = CHARACTER
START_BYTE      = 139
BYTES           = 16
FORMAT         = "A16"
UNIT           = "N/A"
DESCRIPTION     = "General Purpose Word 1, binary"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
NAME            = "GPW2"
DATA_TYPE       = CHARACTER
START_BYTE      = 158
BYTES           = 16
FORMAT         = "A16"
UNIT           = "N/A"
DESCRIPTION     = "General Purpose Word 2, binary"
END_OBJECT      = COLUMN
```

OBJECT = COLUMN  
NAME = "GPW3"  
DATA\_TYPE = CHARACTER  
START\_BYTE = 177  
BYTES = 16  
FORMAT = "A16"  
UNIT = "N/A"  
DESCRIPTION = "General Purpose Word 3, in binary"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "FOOT\_TEMP"  
DATA\_TYPE = CHARACTER  
START\_BYTE = 196  
BYTES = 8  
FORMAT = "A8"  
UNIT = "N/A"  
DESCRIPTION = "Active foot temperature channels.  
Bit field represented as 15 characters, the rightmost character corresponds to bit #0 and the leftmost to bit #6.  
The Temperature and Radiation Dose Data Block will be generated by flight software, if at least one foot temperature channel is selected in FOOT\_TEMP.  
It will additionally be included at the end of a measuring sequence, if the Additional after job flag is set.  
Each character can be 1 (channel selected) or 0 (channel not selected) and have the following meaning.  
bit 0: Temperature -Y, TRM  
bit 1: Temperature -Y, ACC  
bit 2: Temperature +X, TRM  
bit 3: Temperature +X, ACC  
bit 4: Temperature +Y, TRM  
bit 5: Temperature +Y, ACC  
bit 6: Additional after job temperatures  
bit 7 : Do additional housekeeping"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "OUTBUFFER\_PAGE"  
DATA\_TYPE = CHARACTER  
START\_BYTE = 207  
BYTES = 2  
FORMAT = "A2"  
UNIT = "N/A"  
DESCRIPTION = "hex value"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "OUTBUFFER\_ADDRESS"  
DATA\_TYPE = CHARACTER



```
START_BYTE      = 212
BYTES           = 4
FORMAT          = "A4"
UNIT            = "N/A"
DESCRIPTION     = "hex value"
END_OBJECT      = COLUMN
```

#### 4.3.2.4.1.1.2 CASSE Sequence Parameters definition for burst mode

The sequence parameters are described by a TABLE object.

```
OBJECT          = SEQ_PARAM_TABLE
NAME            = "SEQ_PARAM"
INTERCHANGE_FORMAT = ASCII
ROWS           = 6
COLUMNS       = 17
ROW_BYTES      = 149
^STRUCTURE     = "CAS_SEQ_PARAM_BURST2.FMT"
END_OBJECT      = SEQ_PARAM_TABLE
```

The structure of the Sequence parameters TABLE object is defined in the file CAS\_SEQ\_PARAM\_BURST2.FMT.

```
OBJECT          = COLUMN
NAME            = "SESAME_SEQ_ID"
DATA_TYPE       = ASCII_INTEGER
START_BYTE      = 1
BYTES           = 6
UNIT            = "N/A"
FORMAT          = "I6"
DESCRIPTION     = "Sequence ID in the current data file"
END_OBJECT      = COLUMN
```

```
OBJECT          = COLUMN
NAME            = "MEAS_ID"
DATA_TYPE       = ASCII_INTEGER
START_BYTE      = 8
BYTES           = 6
FORMAT          = "I6"
UNIT            = "N/A"
DESCRIPTION     = "Measurement ID in the current sequence"
END_OBJECT      = COLUMN
```

```
OBJECT          = COLUMN
NAME            = "UTC"
DATA_TYPE       = TIME
START_BYTE      = 15
BYTES           = 23
DESCRIPTION     = "Measurement start time (UTC in PDS standard
                  format YYYY-MM-DDThh:mm:ss.sss)"
END_OBJECT      = COLUMN
```

OBJECT = COLUMN  
NAME = "SESAME\_LOCAL\_TIME\_SEQ"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 39  
BYTES = 15  
FORMAT = "I15"  
DESCRIPTION = "Start time of sequence. SESAME local time  
(SLT) runs with a resolution of 1/32 seconds.  
SLT represents the least significant 32 bits of  
LOBT. The most significant 5 bits are in  
CDMS RSST (see SESAME Ready Message)"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "FREQUENCY\_DIVIDER"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 55  
BYTES = 3  
FORMAT = "I3"  
UNIT = "N/A"  
DESCRIPTION = "Adjusted transmitter frequency register value"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "FREQUENCY\_INCREMENT"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 59  
BYTES = 5  
FORMAT = "I5"  
UNIT = "N/A"  
DESCRIPTION = "Adjusted sampling rate registers value"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "CHANNELS"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 65  
BYTES = 3  
FORMAT = "I3"  
UNIT = "N/A"  
DESCRIPTION = "Number of sensor channels minus one"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "ADJ\_SOUND\_FREQ"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 69  
BYTES = 5  
FORMAT = "I5"  
UNIT = "HERTZ"  
DESCRIPTION = "Transmitter frequency.  
Equals zero in Listening mode"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "ADJ\_SAMPLING\_FREQ"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 75  
BYTES = 10  
FORMAT = "I10"  
UNIT = "HERTZ"  
DESCRIPTION = "Sampling frequency per sensor channel"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "SESAME\_LOCAL\_TIME"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 86  
BYTES = 15  
FORMAT = "I15"  
DESCRIPTION = "Start time of measurement. SESAME local time (SLT) runs with a resolution of 1/32 seconds. SLT represents the least significant 32 bits of LOBT. The most significant 5 bits are in CDMS RSST (see SESAME Ready Message)"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "TOTAL\_MEAS\_LENGTH"  
DATA\_TYPE = CHARACTER  
START\_BYTE = 103  
BYTES = 8  
FORMAT = "A8"  
UNIT = "N/A"  
DESCRIPTION = "FIFO RAM address when recording stopped 4 bytes, hexadecimal representation"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "TEMP\_FOOT-Y\_TRM"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 113  
BYTES = 5  
FORMAT = "I5"  
UNIT = "N/A"  
DESCRIPTION = "Foot temperature before measurement"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "TEMP\_FOOT-Y\_ACC"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 119  
BYTES = 5  
FORMAT = "I5"  
UNIT = "N/A"  
DESCRIPTION = "Foot temperature before measurement"

```

END_OBJECT          = COLUMN

OBJECT              = COLUMN
  NAME              = "TEMP_FOOT+X_TRM"
  DATA_TYPE        = ASCII_INTEGER
  START_BYTE        = 125
  BYTES             = 5
  FORMAT            = "I5"
  UNIT              = "N/A"
  DESCRIPTION       = "Foot temperature before measurement"
END_OBJECT          = COLUMN

OBJECT              = COLUMN
  NAME              = "TEMP_FOOT+X_ACC"
  DATA_TYPE        = ASCII_INTEGER
  START_BYTE        = 131
  BYTES             = 5
  FORMAT            = "I5"
  UNIT              = "N/A"
  DESCRIPTION       = "Foot temperature before measurement"
END_OBJECT          = COLUMN

OBJECT              = COLUMN
  NAME              = "TEMP_FOOT+Y_TRM"
  DATA_TYPE        = ASCII_INTEGER
  START_BYTE        = 137
  BYTES             = 5
  FORMAT            = "I5"
  UNIT              = "N/A"
  DESCRIPTION       = "Foot temperature before measurement"
END_OBJECT          = COLUMN

OBJECT              = COLUMN
  NAME              = "TEMP_FOOT+Y_ACC"
  DATA_TYPE        = ASCII_INTEGER
  START_BYTE        = 143
  BYTES             = 5
  FORMAT            = "I5"
  UNIT              = "N/A"
  DESCRIPTION       = "Foot temperature before measurement"
END_OBJECT          = COLUMN
  
```

#### 4.3.2.4.1.1.3 CASSE Sequence Parameters definition for trigger mode

The sequence parameters are described by a TABLE object.

```

OBJECT              = SEQ_PARAM_TABLE
  NAME              = "SEQ_PARAM"
  INTERCHANGE_FORMAT = ASCII
  ROWS              = 3
  COLUMNS          = 21
  ROW_BYTES         = 204
  ^STRUCTURE        = "CAS_SEQ_PARAM_TRIG2.FMT"
END_OBJECT          = SEQ_PARAM_TABLE
  
```

The structure of the Sequence parameters TABLE object is defined in the file CAS\_SEQ\_PARAM\_TRIG2.FMT:

```
OBJECT          = COLUMN
  NAME          = "SESAME_SEQ_ID"
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 1
  BYTES         = 6
  FORMAT        = "I6"
  UNIT          = "N/A"
  DESCRIPTION   = "Sequence ID in the current data file"
END_OBJECT      = COLUMN
```

```
OBJECT          = COLUMN
  NAME          = "MEAS_ID"
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 8
  BYTES         = 6
  FORMAT        = "I6"
  UNIT          = "N/A"
  DESCRIPTION   = "Measurement ID in the current sequence"
END_OBJECT      = COLUMN
```

```
OBJECT          = COLUMN
  NAME          = "UTC"
  DATA_TYPE    = TIME
  START_BYTE    = 15
  BYTES         = 23
  DESCRIPTION   = "This column represents the UTC Time
                  for start of the sequence"
END_OBJECT      = COLUMN
```

```
OBJECT          = COLUMN
  NAME          = "SESAME_LOCAL_TIME"
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 39
  BYTES         = 15
  FORMAT        = "I15"
  DESCRIPTION   = "Start time of measurement. SESAME local time
                  (SLT) runs with a resolution of 1/32 seconds.
                  SLT represents the least significant 32 bits of
                  LOBT. The most significant 5 bits are in
                  CDMS RSST (see SESAME Ready Message)"
END_OBJECT      = COLUMN
```

```
OBJECT          = COLUMN
  NAME          = "ERROR_INIT"
  DATA_TYPE    = CHARACTER
  START_BYTE    = 56
  BYTES         = 4
  FORMAT        = "A4"
  DESCRIPTION   = "Error status after initialisation"
```

in hexadecimal format (2 bytes).

Possible values:

- 0001 EB\_FREQ Invalid frequency increment (adjustment of sampling frequency); default (= 1312) used.
- 0002 EB\_DIVRAT Invalid frequency divider (adjustment of sounding frequency); default (= 1) used.
- 0004 EB\_CDPD\_ADC Error during temperature A/D conversion.
- 4008 EB\_NCHAN Fatal: Invalid number of sensor channels
- 4010 EB\_TIMEO Fatal: Time-out during triggered mode.
- 4020 EB\_NOSTRT Fatal: Measurement start condition not fulfilled.
- 8040 EB\_RAMOVR Fatal: Allocated SESAME SRAM space exhausted.
- 4000 EB\_FATAL\_MES Fatal error or time-out; current measurement will be aborted.

Columns are filled by missing\_constant if the last case occurs (4000), for the concerned measurement"

END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "FREQUENCY\_DIVIDER"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 62  
BYTES = 3  
FORMAT = "I3"  
UNIT = "N/A"  
MISSING\_CONSTANT = 999  
DESCRIPTION = "Adjusted transmitter frequency register value"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "FREQUENCY\_INCREMENT"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 66  
BYTES = 5  
FORMAT = "I5"  
UNIT = "N/A"  
MISSING\_CONSTANT = 99999  
DESCRIPTION = "Adjusted sampling rate registers value"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "CHANNELS"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 72  
BYTES = 3  
FORMAT = "I3"  
UNIT = "N/A"  
MISSING\_CONSTANT = 999  
DESCRIPTION = "Number of sensor channels minus one"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "TRIGGER\_STATUS"

```
DATA_TYPE = ASCII_INTEGER
START_BYTE = 76
BYTES = 4
FORMAT = "I4"
UNIT = "N/A"
MISSING_CONSTANT = 9999
DESCRIPTION = "Contents of Trigger Status Register at
time of trigger (0 - 4095)"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "TIME_BURST_ON"
DATA_TYPE = CHARACTER
START_BYTE = 82
BYTES = 15
FORMAT = "A15"
MISSING_CONSTANT = "9999999999999999"
DESCRIPTION = "SESAME Local Time at start of recording
of measurement represented as :
Reset number (integer starting at 1) / seconds
The time resolution is 0.03125 s"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "TIME_TRIGGER"
DATA_TYPE = CHARACTER
START_BYTE = 100
BYTES = 15
FORMAT = "A15"
MISSING_CONSTANT = "9999999999999999"
DESCRIPTION = "SESAME Local Time when trigger occurred
represented as :
Reset number (integer starting at 1) / seconds
The time resolution is 0.03125 s"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "TIME_BURST_OFF"
DATA_TYPE = CHARACTER
START_BYTE = 118
BYTES = 15
FORMAT = "A15"
MISSING_CONSTANT = "9999999999999999"
DESCRIPTION = "SESAME Local Time at stop of recording
represented as :
Reset number (integer starting at 1) / seconds
The time resolution is 0.03125 s"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "FIFO_TRIGGER"
DATA_TYPE = CHARACTER
START_BYTE = 136
```

```
BYTES = 8
FORMAT = "A8"
MISSING_CONSTANT = "99999999"
DESCRIPTION = "FIFO RAM address when trigger occurred
              in hexadecimal format (4 bytes)"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "FIFO_BURST_OFF"
DATA_TYPE = CHARACTER
START_BYTE = 147
BYTES = 8
FORMAT = "A8"
MISSING_CONSTANT = "99999999"
DESCRIPTION = "FIFO RAM address when recording stopped
              in hexadecimal format (4 bytes)"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "FIFO_FIRST_DAT"
DATA_TYPE = CHARACTER
START_BYTE = 158
BYTES = 8
FORMAT = "A8"
MISSING_CONSTANT = "99999999"
DESCRIPTION = "FIFO RAM address of very first channel data
              in hexadecimal format (4 bytes)"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "TEMP_FOOT-Y_TRM"
DATA_TYPE = ASCII_INTEGER
START_BYTE = 168
BYTES = 5
FORMAT = "I5"
UNIT = "N/A"
DESCRIPTION = "Foot temperature before measurement"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "TEMP_FOOT-Y_ACC"
DATA_TYPE = ASCII_INTEGER
START_BYTE = 174
BYTES = 5
FORMAT = "I5"
UNIT = "N/A"
DESCRIPTION = "Foot temperature before measurement"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "TEMP_FOOT+X_TRM"
DATA_TYPE = ASCII_INTEGER
START_BYTE = 180
```



```

    BYTES                = 5
    FORMAT               = "I5"
    UNIT                 = "N/A"
    DESCRIPTION          = "Foot temperature before measurement"
END_OBJECT              = COLUMN
  
```

```

OBJECT                  = COLUMN
  NAME                  = "TEMP_FOOT+X_ACC"
  DATA_TYPE            = ASCII_INTEGER
  START_BYTE            = 186
  BYTES                 = 5
  FORMAT                = "I5"
  UNIT                  = "N/A"
  DESCRIPTION           = "Foot temperature before measurement"
END_OBJECT              = COLUMN
  
```

```

OBJECT                  = COLUMN
  NAME                  = "TEMP_FOOT+Y_TRM"
  DATA_TYPE            = ASCII_INTEGER
  START_BYTE            = 192
  BYTES                 = 5
  FORMAT                = "I5"
  UNIT                  = "N/A"
  DESCRIPTION           = "Foot temperature before measurement"
END_OBJECT              = COLUMN
  
```

```

OBJECT                  = COLUMN
  NAME                  = "TEMP_FOOT+Y_ACC"
  DATA_TYPE            = ASCII_INTEGER
  START_BYTE            = 198
  BYTES                 = 5
  FORMAT                = "I5"
  UNIT                  = "N/A"
  DESCRIPTION           = "Foot temperature before measurement"
END_OBJECT              = COLUMN
  
```

#### 4.3.2.4.1.1.4 CASSE Data definition

The data produced in sounding or listening modes are described by the following TABLE object.

```

OBJECT                  = DATA_TABLE
  NAME                  = "DATA"
  INTERCHANGE_FORMAT    = ASCII
  ROWS                  = 3852
  COLUMNS              = 26
  ROW_BYTES             = 231
  ^STRUCTURE            = "CAS_DATA2.FMT"
END_OBJECT              = DATA_TABLE
  
```

The structure of the measured data TABLE object is defined in the file CAS\_DATA2.FMT.

```

OBJECT                  = COLUMN
  NAME                  = "SESAME_SEQ_ID"
  
```

```
DATA_TYPE      = ASCII_INTEGER
START_BYTE     = 1
BYTES         = 6
UNIT          = "N/A"
FORMAT        = "I6"
DESCRIPTION    = "Sequence ID in the current data file"
END_OBJECT    = COLUMN

OBJECT         = COLUMN
NAME          = "MEAS_ID"
DATA_TYPE     = ASCII_INTEGER
START_BYTE    = 8
BYTES        = 6
FORMAT       = "I6"
UNIT        = "N/A"
DESCRIPTION  = "Measurement ID in the current sequence"
END_OBJECT  = COLUMN

OBJECT         = COLUMN
NAME          = "RELATIVE_TIME_1"
DATA_TYPE     = ASCII_REAL
START_BYTE    = 15
BYTES        = 10
UNIT        = "MILLISECOND"
FORMAT       = "F10.3"
MISSING_CONSTANT = 99999.999
DESCRIPTION   = "Channel 1 time relative to
                start time of the measurement"
END_OBJECT    = COLUMN

OBJECT         = COLUMN
NAME          = "CHANNEL_1"
DATA_TYPE     = ASCII_INTEGER
START_BYTE    = 26
BYTES        = 6
FORMAT       = "I6"
UNIT        = "N/A"
MISSING_CONSTANT = 999999
DESCRIPTION   = "Channel data :
                - non-linear ADC units for regular (non-stacked)
                  channel data block
                - linearized stacked ADC units for stacked channel
                  data block
                The mode (stacked or regular) is given in the
                  job card file (JOB)"
END_OBJECT    = COLUMN

OBJECT         = COLUMN
NAME          = "RELATIVE_TIME_2"
DATA_TYPE     = ASCII_REAL
START_BYTE    = 33
BYTES        = 10
UNIT        = "MILLISECOND"
```

```
FORMAT = "F10.3"
MISSING_CONSTANT = 99999.999
DESCRIPTION = "Channel 2 time relative to
              start time of the measurement"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "CHANNEL_2"
DATA_TYPE = ASCII_INTEGER
START_BYTE = 44
BYTES = 6
FORMAT = "I6"
UNIT = "N/A"
MISSING_CONSTANT = 999999
DESCRIPTION = "Channel data :
              - non-linear ADC units for regular (non-stacked)
                channel data block
              - linearized stacked ADC units for stacked channel
                data block
              The mode (stacked or regular) is given in the
                job card file (JOBBC)"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "RELATIVE_TIME_3"
DATA_TYPE = ASCII_REAL
START_BYTE = 51
BYTES = 10
UNIT = "MILLISECOND"
FORMAT = "F10.3"
MISSING_CONSTANT = 99999.999
DESCRIPTION = "Channel 3 time relative to
              start time of the measurement"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "CHANNEL_3"
DATA_TYPE = ASCII_INTEGER
START_BYTE = 62
BYTES = 6
FORMAT = "I6"
UNIT = "N/A"
MISSING_CONSTANT = 999999
DESCRIPTION = "Channel data :
              - non-linear ADC units for regular (non-stacked)
                channel data block
              - linearized stacked ADC units for stacked channel
                data block
              The mode (stacked or regular) is given in the
                job card file (JOBBC)"
END_OBJECT = COLUMN

OBJECT = COLUMN
```

```

NAME           = "RELATIVE_TIME_4"
DATA_TYPE      = ASCII_REAL
START_BYTE     = 69
BYTES          = 10
UNIT           = "MILLISECOND"
FORMAT         = "F10.3"
MISSING_CONSTANT = 99999.999
DESCRIPTION    = "Channel 4 time relative to
                  start time of the measurement"
END_OBJECT     = COLUMN

OBJECT         = COLUMN
NAME           = "CHANNEL_4"
DATA_TYPE      = ASCII_INTEGER
START_BYTE     = 80
BYTES          = 6
UNIT           = "N/A"
FORMAT         = "I6"
MISSING_CONSTANT = 999999
DESCRIPTION    = "Channel data :
                  - non-linear ADC units for regular (non-stacked)
                    channel data block
                  - linearized stacked ADC units for stacked channel
                    data block
                  The mode (stacked or regular) is given in the
                    job card file (JOBC)"
END_OBJECT     = COLUMN

OBJECT         = COLUMN
NAME           = "RELATIVE_TIME_5"
DATA_TYPE      = ASCII_REAL
START_BYTE     = 87
BYTES          = 10
UNIT           = "MILLISECOND"
FORMAT         = "F10.3"
MISSING_CONSTANT = 99999.999
DESCRIPTION    = "Channel 5 time relative to
                  start time of the measurement"
END_OBJECT     = COLUMN

OBJECT         = COLUMN
NAME           = "CHANNEL_5"
DATA_TYPE      = ASCII_INTEGER
START_BYTE     = 98
BYTES          = 6
UNIT           = "N/A"
FORMAT         = "I6"
MISSING_CONSTANT = 999999
DESCRIPTION    = "Channel data :
                  - non-linear ADC units for regular (non-stacked)
                    channel data block
                  - linearized stacked ADC units for stacked channel
                    data block
  
```

```

                                The mode (stacked or regular) is given in the
                                job card file (JOBCL)
END_OBJECT                       = COLUMN

OBJECT                           = COLUMN
  NAME                           = "RELATIVE_TIME_6"
  DATA_TYPE                     = ASCII_REAL
  START_BYTE                     = 105
  BYTES                          = 10
  UNIT                           = "MILLISECOND"
  FORMAT                         = "F10.3"
  MISSING_CONSTANT              = 99999.999
  DESCRIPTION                    = "Channel 6 time relative to
                                start time of the measurement"
END_OBJECT                       = COLUMN

OBJECT                           = COLUMN
  NAME                           = "CHANNEL_6"
  DATA_TYPE                     = ASCII_INTEGER
  START_BYTE                     = 116
  BYTES                          = 6
  FORMAT                         = "I6"
  UNIT                           = "N/A"
  MISSING_CONSTANT              = 999999
  DESCRIPTION                    = "Channel data :
                                - non-linear ADC units for regular (non-stacked)
                                channel data block
                                - linearized stacked ADC units for stacked channel
                                data block
                                The mode (stacked or regular) is given in the
                                job card file (JOBCL)"
END_OBJECT                       = COLUMN

OBJECT                           = COLUMN
  NAME                           = "RELATIVE_TIME_7"
  DATA_TYPE                     = ASCII_REAL
  START_BYTE                     = 123
  BYTES                          = 10
  UNIT                           = "MILLISECOND"
  FORMAT                         = "F10.3"
  MISSING_CONSTANT              = 99999.999
  DESCRIPTION                    = "Channel 7 time relative to
                                start time of the measurement"
END_OBJECT                       = COLUMN

OBJECT                           = COLUMN
  NAME                           = "CHANNEL_7"
  DATA_TYPE                     = ASCII_INTEGER
  START_BYTE                     = 134
  BYTES                          = 6
  FORMAT                         = "I6"
  UNIT                           = "N/A"
  MISSING_CONSTANT              = 999999
```

```
DESCRIPTION = "Channel data :
- non-linear ADC units for regular (non-stacked)
channel data block
- linearized stacked ADC units for stacked channel
data block
The mode (stacked or regular) is given in the
job card file (JOBC)"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "RELATIVE_TIME_8"
DATA_TYPE = ASCII_REAL
START_BYTE = 141
BYTES = 10
UNIT = "MILLISECOND"
FORMAT = "F10.3"
MISSING_CONSTANT = 99999.999
DESCRIPTION = "Channel 8 time relative to
start time of the measurement"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "CHANNEL_8"
DATA_TYPE = ASCII_INTEGER
START_BYTE = 152
BYTES = 6
FORMAT = "I6"
UNIT = "N/A"
MISSING_CONSTANT = 999999
DESCRIPTION = "Channel data :
- non-linear ADC units for regular (non-stacked)
channel data block
- linearized stacked ADC units for stacked channel
data block
The mode (stacked or regular) is given in the
job card file (JOBC)"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "RELATIVE_TIME_9"
DATA_TYPE = ASCII_REAL
START_BYTE = 159
BYTES = 10
UNIT = "MILLISECOND"
FORMAT = "F10.3"
MISSING_CONSTANT = 99999.999
DESCRIPTION = "Channel 9 time relative to
start time of the measurement"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "CHANNEL_9"
DATA_TYPE = ASCII_INTEGER
```

```
START_BYTE = 170
BYTES = 6
FORMAT = "I6"
UNIT = "N/A"
MISSING_CONSTANT = 999999
DESCRIPTION = "Channel data :
- non-linear ADC units for regular (non-stacked)
channel data block
- linearized stacked ADC units for stacked channel
data block
The mode (stacked or regular) is given in the
job card file (JOB)"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "RELATIVE_TIME_10"
DATA_TYPE = ASCII_REAL
START_BYTE = 177
BYTES = 10
UNIT = "MILLISECOND"
FORMAT = "F10.3"
MISSING_CONSTANT = 99999.999
DESCRIPTION = "Channel 10 time relative to
start time of the measurement"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "CHANNEL_10"
DATA_TYPE = ASCII_INTEGER
START_BYTE = 188
BYTES = 6
FORMAT = "I6"
UNIT = "N/A"
MISSING_CONSTANT = 999999
DESCRIPTION = "Channel data :
- non-linear ADC units for regular (non-stacked)
channel data block
- linearized stacked ADC units for stacked channel
data block
The mode (stacked or regular) is given in the
job card file (JOB)"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "RELATIVE_TIME_11"
DATA_TYPE = ASCII_REAL
START_BYTE = 195
BYTES = 10
UNIT = "MILLISECOND"
FORMAT = "F10.3"
MISSING_CONSTANT = 99999.999
DESCRIPTION = "Channel 11 time relative to
start time of the measurement"
```

```
END_OBJECT          = COLUMN

OBJECT              = COLUMN
  NAME              = "CHANNEL_11"
  DATA_TYPE        = ASCII_INTEGER
  START_BYTE        = 206
  BYTES             = 6
  FORMAT            = "I6"
  UNIT              = "N/A"
  MISSING_CONSTANT  = 999999
  DESCRIPTION       = "Channel data :
- non-linear ADC units for regular (non-stacked)
  channel data block
- linearized stacked ADC units for stacked channel
  data block
The mode (stacked or regular) is given in the
job card file (JOB)"

END_OBJECT          = COLUMN

OBJECT              = COLUMN
  NAME              = "RELATIVE_TIME_12"
  DATA_TYPE        = ASCII_REAL
  START_BYTE        = 213
  BYTES             = 10
  UNIT              = "MILLISECOND"
  FORMAT            = "F10.3"
  MISSING_CONSTANT  = 99999.999
  DESCRIPTION       = "Channel 12 time relative to
  start time of the measurement"

END_OBJECT          = COLUMN

OBJECT              = COLUMN
  NAME              = "CHANNEL_12"
  DATA_TYPE        = ASCII_INTEGER
  START_BYTE        = 224
  BYTES             = 6
  FORMAT            = "I6"
  UNIT              = "N/A"
  MISSING_CONSTANT  = 999999
  DESCRIPTION       = "Channel data :
- non-linear ADC units for regular (non-stacked)
  channel data block
- linearized stacked ADC units for stacked channel
  data block
The mode (stacked or regular) is given in the
job card file (JOB)"

END_OBJECT          = COLUMN
```

### CASSE temperatures after measurement

The feet temperatures (accelerometers and transmitters) can be acquired also after a measurement (sounding or listening). They will be stored in ASCII table described by a TABLE object.

```
OBJECT              = TAFT_TABLE
```



```
NAME = "TAFT"  
INTERCHANGE_FORMAT = ASCII  
ROWS =  
COLUMNS = 8  
ROW_BYTES = 52  
^STRUCTURE = "CAS_TAFT2.FMT"  
END_OBJECT = TAFT_TABLE
```

The structure of the "after measurement temperatures" TABLE object is defined in the file CAS\_TAFT2.FMT.

```
OBJECT = COLUMN  
NAME = "SESAME_SEQ_ID"  
DATA_TYPE = ASCII_INTEGER  
START_BYTE = 1  
BYTES = 6  
UNIT = "N/A"  
FORMAT = "I6"  
DESCRIPTION = "Sequence ID in the current data file"  
END_OBJECT = COLUMN
```

```
OBJECT = COLUMN  
NAME = "MEAS_ID"  
DATA_TYPE = ASCII_INTEGER  
START_BYTE = 8  
BYTES = 6  
FORMAT = "I6"  
UNIT = "N/A"  
DESCRIPTION = "Measurement ID in the current sequence"  
END_OBJECT = COLUMN
```

```
OBJECT = COLUMN  
NAME = "TEMP_FOOT-Y_TRM"  
DATA_TYPE = ASCII_INTEGER  
START_BYTE = 15  
BYTES = 5  
FORMAT = "I5"  
UNIT = "N/A"  
DESCRIPTION = "Foot temperature after measurement"  
END_OBJECT = COLUMN
```

```
OBJECT = COLUMN  
NAME = "TEMP_FOOT-Y_ACC"  
DATA_TYPE = ASCII_INTEGER  
START_BYTE = 21  
BYTES = 5  
FORMAT = "I5"  
UNIT = "N/A"  
DESCRIPTION = "Foot temperature after measurement"  
END_OBJECT = COLUMN
```

```
OBJECT = COLUMN  
NAME = "TEMP_FOOT+X_TRM"
```

```

DATA_TYPE      = ASCII_INTEGER
START_BYTE     = 27
BYTES          = 5
FORMAT         = "I5"
UNIT           = "N/A"
DESCRIPTION    = "Foot temperature after measurement"
END_OBJECT     = COLUMN
  
```

```

OBJECT         = COLUMN
NAME           = "TEMP_FOOT+X_ACC"
DATA_TYPE     = ASCII_INTEGER
START_BYTE    = 33
BYTES         = 5
FORMAT        = "I5"
UNIT          = "N/A"
DESCRIPTION   = "Foot temperature after measurement"
END_OBJECT    = COLUMN
  
```

```

OBJECT         = COLUMN
NAME           = "TEMP_FOOT+Y_TRM"
DATA_TYPE     = ASCII_INTEGER
START_BYTE    = 39
BYTES         = 5
FORMAT        = "I5"
UNIT          = "N/A"
DESCRIPTION   = "Foot temperature after measurement"
END_OBJECT    = COLUMN
  
```

```

OBJECT         = COLUMN
NAME           = "TEMP_FOOT+Y_ACC"
DATA_TYPE     = ASCII_INTEGER
START_BYTE    = 45
BYTES         = 5
FORMAT        = "I5"
UNIT          = "N/A"
DESCRIPTION   = "Foot temperature after measurement"
END_OBJECT    = COLUMN
  
```

#### 4.3.2.4.1.2 Flight software version FM3

##### 4.3.2.4.1.2.1 CASSE job card definition

The job card is described by a TABLE object.

```

OBJECT         = JOBC_TABLE
NAME           = "JOB_CARD"
INTERCHANGE_FORMAT = ASCII
ROWS          = 12
COLUMNS      = 29
ROW_BYTES     = 176
^STRUCTURE    = "CAS_JOB_CARD_FM3.FMT"
END_OBJECT    = JOBC_TABLE
  
```

The structure of the TABLE object is defined in the file CAS\_JOB\_CARD\_FM3.FMT.

```
OBJECT = COLUMN
  NAME = "SESAME_SEQ_ID"
  DATA_TYPE = ASCII_INTEGER
  START_BYTE = 1
  BYTES = 6
  FORMAT = "I6"
  UNIT = "N/A"
  DESCRIPTION = "Sequence ID in the current data file"
END_OBJECT = COLUMN
```

```
OBJECT = COLUMN
  NAME = "JOB_ID"
  DATA_TYPE = CHARACTER
  START_BYTE = 9
  BYTES = 2
  FORMAT = "A2"
  UNIT = "N/A"
  DESCRIPTION = "Jobcard identifier (hex value)"
END_OBJECT = COLUMN
```

```
OBJECT = COLUMN
  NAME = "JOB_VERSION"
  DATA_TYPE = CHARACTER
  START_BYTE = 14
  BYTES = 1
  FORMAT = "A1"
  UNIT = "N/A"
  DESCRIPTION = "The possible values are:
    0 for FM-1 and FM-2
    B for FM-3"
END_OBJECT = COLUMN
```

```
OBJECT = COLUMN
  NAME = "NMEAS"
  DATA_TYPE = ASCII_INTEGER
  START_BYTE = 17
  BYTES = 3
  FORMAT = "I3"
  UNIT = "N/A"
  DESCRIPTION = "Number of measurements (1 to 127)"
END_OBJECT = COLUMN
```

```
OBJECT = COLUMN
  NAME = "STACK"
  DATA_TYPE = CHARACTER
  START_BYTE = 22
  BYTES = 3
  FORMAT = "A3"
  UNIT = "N/A"
  DESCRIPTION = "Indicates that the time series shall
    be stacked on board. The possible
    values are YES or NO."
```

END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "SOUND\_FREQ"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 27  
BYTES = 5  
FORMAT = "I5"  
UNIT = "HERTZ"  
DESCRIPTION = "Nominal sounding frequency"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "SND\_DURATION"  
DATA\_TYPE = ASCII\_REAL  
START\_BYTE = 33  
BYTES = 9  
FORMAT = "F9.1"  
UNIT = "MILLISECOND"  
MISSING\_CONSTANT = 9999999.9  
DESCRIPTION = "Sounding duration in sounding mode"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "TRIGGER\_TIMEOUT"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 43  
BYTES = 5  
FORMAT = "I5"  
UNIT = "SECOND"  
MISSING\_CONSTANT = 99999  
DESCRIPTION = "Time-out duration, after which listening stops  
if no trigger signal occurred"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "SAMPLING\_FREQ"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 49  
BYTES = 6  
FORMAT = "I6"  
UNIT = "HERTZ"  
DESCRIPTION = "Sampling frequency per channel"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "TX\_STATUS"  
DATA\_TYPE = CHARACTER  
START\_BYTE = 57  
BYTES = 5  
FORMAT = "A5"  
UNIT = "N/A"  
DESCRIPTION = "Selection of transmitters to be used in

Sounding Mode. If TX\_cycle is set, after a measurement the transmitter selection is (cyclically) shifted by one position up to yield the transmitters to be used for the next measurement. If Tx\_reverse is additionally set, the selection of active transmitters is shifted one position downwards instead.

Bit field represented as 5 characters, the rightmost character corresponds to bit #0 and the leftmost to bit #4.

Each character can be 1 (active sensor or cycle on or reversed on) or 0 (sensor not used) and have the following meaning:

- bit 0: TRM -Y
- bit 1: TRM +X
- bit 2: TRM +Y
- bit 3: TX\_cycle
- bit 4: TX\_reverse"

END\_OBJECT = COLUMN

OBJECT = COLUMN

NAME = "AGC"

DATA\_TYPE = CHARACTER

START\_BYTE = 65

BYTES = 2

FORMAT = "A2"

UNIT = "N/A"

DESCRIPTION = "Amplification gain selection (hex value)  
Value to be written to the Amplifier Gain Control register of CASSE electronics. Decimal value ranges from 0 (maximal gain) to 15 (minimal gain). Note (a) the gain is not a monotone function of the AGC value, (b) the actually adjusted gain can deviate, if automatic gain setting (AGS) is enabled."

END\_OBJECT = COLUMN

OBJECT = COLUMN

NAME = "TRIGGER\_SRC"

DATA\_TYPE = CHARACTER

START\_BYTE = 70

BYTES = 12

FORMAT = "A12"

UNIT = "N/A"

DESCRIPTION = "Subset of active sensor channels used as trigger sources. Bit field represented as 12 characters, the rightmost character corresponds to bit #0 and the leftmost to bit #11.  
Each character can be 1 (active sensor used as a trigger source) or 0 (sensor not used as a trigger source) and have the following meaning:

- bit 0: ACC -Y, x-axis
- bit 1: ACC -Y, y-axis
- bit 2: ACC -Y, z-axis

```
bit 3: ACC +X, x-axis
bit 4: ACC +X, y-axis
bit 5: ACC +X, z-axis
bit 6: ACC +Y, x-axis
bit 7: ACC +Y, y-axis
bit 8: ACC +Y, z-axis
bit 9: TRM -Y
bit 10: TRM +X
bit 11: TRM +Y"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "TRIGGER_DELAY"
DATA_TYPE = ASCII_REAL
START_BYTE = 84
BYTES = 9
FORMAT = "F9.1"
UNIT = "MILLISECOND"
DESCRIPTION = "Determines the time range before (negative
value) or after (positive value) a trigger
event, which shall be included in the time series.
Absolute value of TrgDelay must be less or equal
LIS_DURATION."
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "TRIGGER_LEVEL_POS"
DATA_TYPE = ASCII_INTEGER
START_BYTE = 94
BYTES = 4
FORMAT = "I4"
UNIT = "N/A"
DESCRIPTION = "Positive trigger level.
Value to be written to the UTT hardware register,
which fixes the upper (always positive) trigger
threshold. Note that the actually adjusted value
can be different, if automatic trigger level setting
is enabled."
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "TRIGGER_LEVEL_NEG"
DATA_TYPE = ASCII_INTEGER
START_BYTE = 99
BYTES = 4
FORMAT = "I4"
UNIT = "N/A"
DESCRIPTION = "Negative trigger level.
Value to be written to the LTT hardware register,
which fixes the lower (always negative) trigger
threshold. Note that the actually adjusted value
can be different, if automatic trigger level setting
is enabled."
```

```
END_OBJECT          = COLUMN

OBJECT              = COLUMN
  NAME              = "LIS_DURATION"
  DATA_TYPE        = ASCII_REAL
  START_BYTE        = 104
  BYTES             = 9
  FORMAT            = "F9.1"
  UNIT              = "MILLISECOND"
  DESCRIPTION        = "Listening duration"
END_OBJECT          = COLUMN
```

```
OBJECT              = COLUMN
  NAME              = "RX_STATUS"
  DATA_TYPE        = CHARACTER
  START_BYTE        = 115
  BYTES             = 14
  FORMAT            = "A14"
  UNIT              = "N/A"
  DESCRIPTION        = "Selection of sensor channels to be used. If cycle
                        is set, after a measurement the receiver selection
                        is (cyclically) shifted by one position (in the same
                        direction as the transmitters, as indicated in
                        TX_STATUS. If the reversed flag is additionally set,
                        the receiver cycling shall take place in the opposite
                        direction as the transmitter cycling.
                        Bit field represented as 15 characters, the rightmost
                        character corresponds to bit #0 and the leftmost to
                        bit #13.
                        Each character can be 1 (active sensor or cycle on or
                        reversed on) or 0 (sensor not used) and have the
                        following meaning:
                        bit 0: ACC -Y, x-axis
                        bit 1: ACC -Y, y-axis
                        bit 2: ACC -Y, z-axis
                        bit 3: ACC +X, x-axis
                        bit 4: ACC +X, y-axis
                        bit 5: ACC +X, z-axis
                        bit 6: ACC +Y, x-axis
                        bit 7: ACC +Y, y-axis
                        bit 8: ACC +Y, z-axis
                        bit 9: TRM -Y
                        bit 10: TRM +X
                        bit 11: TRM +Y
                        bit 12: cycle
                        bit 13: reversed"
END_OBJECT          = COLUMN
```

```
OBJECT              = COLUMN
  NAME              = "G_GEN"
  DATA_TYPE        = ASCII_INTEGER
  START_BYTE        = 131
  BYTES             = 1
```





```
OBJECT = COLUMN
  NAME = "SKIP_TS"
  DATA_TYPE = ASCII_INTEGER
  START_BYTE = 141
  BYTES = 1
  FORMAT = "I1"
  UNIT = "N/A"
  DESCRIPTION = "Values 1 or 0
                  If 1 time series not included into telemetry
                  (ignored in Stacking Mode)"
END_OBJECT = COLUMN

OBJECT = COLUMN
  NAME = "G_TAR_VAL"
  DATA_TYPE = ASCII_INTEGER
  START_BYTE = 143
  BYTES = 3
  FORMAT = "I3"
  UNIT = "N/A"
  DESCRIPTION = "Target value for automatic gain adjustment.
                  Linearized ADC units in the range 1 to 255.
                  In combination with the value of G_COMP,
                  gain is adjusted such that the absolute
                  values of the samples of 1/3, 2/3 or all
                  channels are close to, but below, G_TAR_VAL."
END_OBJECT = COLUMN

OBJECT = COLUMN
  NAME = "TL_FACTOR"
  DATA_TYPE = ASCII_INTEGER
  START_BYTE = 147
  BYTES = 4
  FORMAT = I4
  UNIT = "N/A"
  DESCRIPTION = "Factor for calculating the trigger levels from
                  10 to 2550%.
                  Distance of trigger level from mean of time
                  series (of selected trigger channels) relative
                  to the distance between mean and the extreme
                  sample values; TL_FACTOR equals 10 (100 %)
                  means that trigger level are set equal to the
                  maximum deviation from mean during the
                  pre-measurement.
                  A TLFactor value less than or equal 10 would
                  have caused a trigger signal during the
                  pre-measurement. For each sensor channel
                  marked as trigger channel, flight software
                  calculates preliminary trigger levels based on
                  statistical values (Max, Min, Mean) of a
                  pre-measurement with
                  trglevneg = (Min-Mean) * TLFactor / 10 + Mean
                  trglevpos = (Max-Mean) * TLFactor / 10 + Mean
```

The smallest value of the `trglevneg` obtained this way is adjusted as negative trigger level (`TrgLevNeg`), and the highest `trglevpos` as positive trigger level (`TrgLevPos`), possible after correcting different gain settings during the pre-measurement and the Trigger Mode measurement."

END\_OBJECT

= COLUMN

OBJECT

= COLUMN

NAME

= "AMP\_SETUP"

DATA\_TYPE

= ASCII\_REAL

START\_BYTE

= 152

BYTES

= 4

FORMAT

= "F4.1"

UNIT

= "SECOND"

DESCRIPTION

= "Amplifier setup time in sounding mode.

It represents the Duration after start of time series recording used for amplifier setup (to yield constant base lines). A value of 1 s should normally be used, because it enables the correct identification of sensor channels for all possible sampling frequencies (no wrap-around of FIFO buffer)."

END\_OBJECT

= COLUMN

OBJECT

= COLUMN

NAME

= "FIFO\_LAG"

DATA\_TYPE

= ASCII\_INTEGER

START\_BYTE

= 157

BYTES

= 4

FORMAT

= I4

UNIT

= "N/A"

DESCRIPTION

= "Optional corrective offset of the address of the first sample to be transferred. Range from -127 to 127"

END\_OBJECT

= COLUMN

OBJECT

= COLUMN

NAME

= "FOOT\_TEMP"

DATA\_TYPE

= CHARACTER

START\_BYTE

= 163

BYTES

= 7

FORMAT

= "A7"

UNIT

= "N/A"

DESCRIPTION

= "Active foot temperature channels.

Bit field represented as 7 characters, the rightmost character corresponds to bit #0 and the leftmost to bit #6.

The Temperature and Radiation Dose Data Block will be generated by flight software, if at least one foot temperature channel is selected in

FOOT\_TEMP. It will additionally be included at the end of a measuring sequence, if the additional 'after job temperature' flag is set. Each character can be 1 (channel selected) or 0 (channel not selected) and have the following meaning:

- bit 0: Temperature -Y, TRM
- bit 1: Temperature -Y, ACC
- bit 2: Temperature +X, TRM
- bit 3: Temperature +X, ACC
- bit 4: Temperature +Y, TRM
- bit 5: Temperature +Y, ACC
- bit 6: Additional after job temperatures"

```

END_OBJECT      = COLUMN

OBJECT          = COLUMN
  NAME          = "ADD_DELAY"
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 172
  BYTES         = 3
  UNIT          = "SECOND"
  FORMAT        = I3
  DESCRIPTION   = "Additional delay between measurements of
                  a measurement sequence"
END_OBJECT      = COLUMN
  
```

#### 4.3.2.4.1.2.2 CASSE Sequence Parameters definition for burst mode (level 2, FM3)

The sequence parameters are described by a TABLE object.

```

OBJECT          = SEQ_PARAM_TABLE
  NAME          = "SEQ_PARAM"
  INTERCHANGE_FORMAT = ASCII
  ROWS          = 12
  COLUMNS      = 22
  ROW_BYTES     = 189
  ^STRUCTURE   = "CAS_SEQ_PARAM_BURST2_FM3.FMT"
END_OBJECT      = SEQ_PARAM_TABLE
  
```

The structure of the Sequence parameters TABLE object is defined in the file CAS\_SEQ\_PARAM\_BURST2\_FM3.FMT.

```

OBJECT          = COLUMN
  NAME          = "SESAME_SEQ_ID"
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 1
  BYTES         = 6
  FORMAT        = "I6"
  UNIT          = "N/A"
  DESCRIPTION   = "Sequence ID in the current data file"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
  
```

```
NAME = "MEAS_ID"
DATA_TYPE = ASCII_INTEGER
START_BYTE = 8
BYTES = 6
FORMAT = "I6"
UNIT = "N/A"
DESCRIPTION = "Measurement index, i.e. the number
              of the measurement in the file.
              Starts from 1."
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "UTC"
DATA_TYPE = TIME
START_BYTE = 15
BYTES = 23
DESCRIPTION = "Measurement start time (UTC in PDS standard
              format YYYY-MM-DDThh:mm:ss.sss)"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "SESAME_LOCAL_TIME"
DATA_TYPE = ASCII_INTEGER
START_BYTE = 39
BYTES = 15
FORMAT = "I15"
DESCRIPTION = "Start time of measurement. SESAME local time
              (SLT) runs with a resolution of 1/32 seconds.
              SLT represents the least significant 32 bits of
              LOBT. The most significant 5 bits are in
              CDMS RSST (see SESAME Ready Message)"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "FREQUENCY_DIVIDER"
DATA_TYPE = ASCII_INTEGER
START_BYTE = 55
BYTES = 3
FORMAT = "I3"
UNIT = "N/A"
DESCRIPTION = "Value of transmitter frequency control register"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "FREQUENCY_INCREMENT"
DATA_TYPE = ASCII_INTEGER
START_BYTE = 59
BYTES = 5
FORMAT = "I5"
UNIT = "N/A"
DESCRIPTION = "Value of sampling rate control registers"
END_OBJECT = COLUMN
```

OBJECT = COLUMN  
NAME = "CHANNELS"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 65  
BYTES = 3  
FORMAT = "I3"  
UNIT = "N/A"  
DESCRIPTION = "Number of sensor channels, derived from SLTLA  
word (sensor lookup table length and address  
register)"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "AGC"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 69  
BYTES = 5  
FORMAT = "I5"  
UNIT = "N/A"  
DESCRIPTION = "Value of amplifier gain control register"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "POWER\_SETTING"  
DATA\_TYPE = CHARACTER  
START\_BYTE = 76  
BYTES = 8  
FORMAT = "A8"  
UNIT = "N/A"  
DESCRIPTION = "Power register setting /mode  
(hex value):  
Bits 0 to 3: value of power control register  
Bits 4 to 7 = 0: power set during measurement  
initialization  
Bits 4 to 7 = 1: power set by previous  
CAS\_PWRSW command"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "TIME\_BURST\_ON"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 86  
BYTES = 10  
FORMAT = "I10"  
UNIT = "N/A"  
DESCRIPTION = "SESAME High Resolution Time at start of recording  
with a resolution of 1/1024 s"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "TIME\_BURST\_OFF"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 97

```
    BYTES                = 10
    UNIT                  = "N/A"
    FORMAT                = "I10"
    DESCRIPTION           = "SESAME High Resolution Time when recording
                           with a resolution of 1/1024 s"
END_OBJECT              = COLUMN

OBJECT                  = COLUMN
    NAME                  = "FIFO_BURST_OFF"
    DATA_TYPE            = CHARACTER
    START_BYTE            = 109
    BYTES                 = 8
    UNIT                  = "N/A"
    FORMAT                = "A8"
    DESCRIPTION           = "FIFO address of the final sample after
                           recording stopped (hex value)"
END_OBJECT              = COLUMN

OBJECT                  = COLUMN
    NAME                  = "FIFO_FIRST_DAT"
    DATA_TYPE            = CHARACTER
    START_BYTE            = 120
    BYTES                 = 8
    UNIT                  = "N/A"
    FORMAT                = "A8"
    DESCRIPTION           = "FIFO address of the first sample included
                           in telemetry (hex value)"
END_OBJECT              = COLUMN

OBJECT                  = COLUMN
    NAME                  = "NSAMP"
    DATA_TYPE            = ASCII_INTEGER
    START_BYTE            = 130
    BYTES                 = 10
    FORMAT                = "I10"
    UNIT                  = "N/A"
    DESCRIPTION           = "Number of samples per channel in telemetry"
END_OBJECT              = COLUMN

OBJECT                  = COLUMN
    NAME                  = "TEMP_FOOT-Y_TRM"
    DATA_TYPE            = ASCII_INTEGER
    START_BYTE            = 141
    BYTES                 = 5
    FORMAT                = "I5"
    UNIT                  = "MILLIVOLT"
    MISSING_CONSTANT      = 99999
    DESCRIPTION           = "-Y_Foot TRM temperature before measurement"
END_OBJECT              = COLUMN

OBJECT                  = COLUMN
    NAME                  = "TEMP_FOOT-Y_ACC"
    DATA_TYPE            = ASCII_INTEGER
```

```

START_BYTE      = 147
BYTES           = 5
FORMAT          = "I5"
UNIT            = "MILLIVOLT"
MISSING_CONSTANT = 99999
DESCRIPTION     = "-Y_Foot ACC temperature before measurement"
END_OBJECT      = COLUMN
    
```

```

OBJECT          = COLUMN
NAME            = "TEMP_FOOT+X_TRM"
DATA_TYPE       = ASCII_INTEGER
START_BYTE      = 153
BYTES           = 5
FORMAT          = "I5"
UNIT            = "MILLIVOLT"
MISSING_CONSTANT = 99999
DESCRIPTION     = "+X_Foot TRM temperature before measurement"
END_OBJECT      = COLUMN
    
```

```

OBJECT          = COLUMN
NAME            = "TEMP_FOOT+X_ACC"
DATA_TYPE       = ASCII_INTEGER
START_BYTE      = 159
BYTES           = 5
FORMAT          = "I5"
UNIT            = "MILLIVOLT"
MISSING_CONSTANT = 99999
DESCRIPTION     = "+X_Foot ACC temperature before measurement"
END_OBJECT      = COLUMN
    
```

```

OBJECT          = COLUMN
NAME            = "TEMP_FOOT+Y_TRM"
DATA_TYPE       = ASCII_INTEGER
START_BYTE      = 165
BYTES           = 5
FORMAT          = "I5"
UNIT            = "MILLIVOLT"
MISSING_CONSTANT = 99999
DESCRIPTION     = "+Y_Foot TRM temperature before measurement"
END_OBJECT      = COLUMN
    
```

```

OBJECT          = COLUMN
NAME            = "TEMP_FOOT+Y_ACC"
DATA_TYPE       = ASCII_INTEGER
START_BYTE      = 171
BYTES           = 5
FORMAT          = "I5"
UNIT            = "MILLIVOLT"
MISSING_CONSTANT = 99999
DESCRIPTION     = "+Y_Foot ACC temperature before measurement"
END_OBJECT      = COLUMN
    
```

```

OBJECT          = COLUMN
    
```

```

NAME           = "CASSE_PCB_TEMP"
DATA_TYPE      = ASCII_INTEGER
START_BYTE     = 177
BYTES          = 5
FORMAT         = "I5"
UNIT           = "MILLIVOLT"
MISSING_CONSTANT = 99999
DESCRIPTION    = "CASSE PCB temperature"
END_OBJECT     = COLUMN
  
```

```

OBJECT        = COLUMN
NAME          = "RADFET_VOLTAGE"
DATA_TYPE     = ASCII_INTEGER
START_BYTE    = 183
BYTES         = 5
FORMAT       = "I5"
UNIT         = "MILLIVOLT"
MISSING_CONSTANT = 99999
DESCRIPTION  = "RadFET voltage (0.002 V/mV)"
END_OBJECT   = COLUMN
  
```

#### 4.3.2.4.1.2.3 CASSE Sequence Parameters definition for trigger mode

The sequence parameters are described by a TABLE object.

```

OBJECT        = SEQ_PARAM_TABLE
NAME          = "SEQ_PARAM"
INTERCHANGE_FORMAT = ASCII
ROWS          = 7
COLUMNS     = 25
ROW_BYTES    = 220
^STRUCTURE   = "CAS_SEQ_PARAM_TRIG2_FM3.FMT"
END_OBJECT    = SEQ_PARAM_TABLE
  
```

The structure of the Sequence parameters TABLE object is defined in the file CAS\_SEQ\_PARAM\_TRIG2\_FM3.FMT.

```

OBJECT        = COLUMN
NAME          = "SESAME_SEQ_ID"
DATA_TYPE     = ASCII_INTEGER
START_BYTE    = 1
BYTES         = 6
FORMAT       = "I6"
UNIT         = "N/A"
DESCRIPTION  = "Sequence ID in the current data file"
END_OBJECT    = COLUMN
  
```

```

OBJECT        = COLUMN
NAME          = "MEAS_ID"
DATA_TYPE     = ASCII_INTEGER
START_BYTE    = 8
BYTES         = 6
FORMAT       = "I6"
  
```



UNIT = "N/A"  
DESCRIPTION = "Measurement index, i.e. the number of the measurement in the file. Starts from 1."  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "UTC"  
DATA\_TYPE = TIME  
START\_BYTE = 15  
BYTES = 23  
DESCRIPTION = "Measurement start time (UTC in PDS standard format YYYY-MM-DDThh:mm:ss.sss)"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "SESAME\_LOCAL\_TIME"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 39  
BYTES = 15  
FORMAT = "I15"  
DESCRIPTION = "Start time of measurement. SESAME local time (SLT) runs with a resolution of 1/32 seconds. SLT represents the least significant 32 bits of LOBT. The most significant 5 bits are in CDMS RSST (see SESAME Ready Message)"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "FREQUENCY\_DIVIDER"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 55  
BYTES = 3  
FORMAT = "I3"  
UNIT = "N/A"  
DESCRIPTION = "Value of transmitter frequency control register"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "FREQUENCY\_INCREMENT"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 59  
BYTES = 5  
FORMAT = "I5"  
UNIT = "N/A"  
DESCRIPTION = "Value of sampling rate control registers"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "CHANNELS"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 65  
BYTES = 3

FORMAT = "I3"  
UNIT = "N/A"  
DESCRIPTION = "Number of sensor channels, derived from SLTLA  
word (sensor lookup table length and address  
register)"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "AGC"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 69  
BYTES = 5  
FORMAT = "I5"  
UNIT = "N/A"  
DESCRIPTION = "Value of amplifier gain control register"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "POWER\_SETTING"  
DATA\_TYPE = CHARACTER  
START\_BYTE = 76  
BYTES = 8  
FORMAT = "A8"  
UNIT = "N/A"  
DESCRIPTION = "Power register setting / mode (hex value):  
Bits 0 to 3: value of power control register  
Bits 4 to 7 = 0: power set during measurement  
initialization  
Bits 4 to 7 = 1: power set by previous  
CAS\_PWRSW command"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "TRIGGER\_STATUS"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 86  
BYTES = 8  
FORMAT = "I8"  
UNIT = "N/A"  
MISSING\_CONSTANT = 16#FFFF#  
DESCRIPTION = "Trigger status register indicating the channel(s)  
which triggered (hex value as 16#xxxx#)"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "TIME\_BURST\_ON"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 95  
BYTES = 10  
UNIT = "N/A"  
FORMAT = "I10"  
DESCRIPTION = "SESAME High Resolution Time at start of recording  
with a resolution of 1/1024 s"

END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "TIME\_TRIGGER"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 106  
BYTES = 10  
FORMAT = "I10"  
UNIT = "N/A"  
DESCRIPTION = "SESAME High Resolution Time when trigger occurred with a resolution of 1/1024 s"

END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "TIME\_BURST\_OFF"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 117  
BYTES = 10  
UNIT = "N/A"  
FORMAT = "I10"  
DESCRIPTION = "SESAME High Resolution Time when recording with a resolution of 1/1024 s"

END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "FIFO\_TRIGGER"  
DATA\_TYPE = CHARACTER  
START\_BYTE = 129  
BYTES = 8  
FORMAT = "A8"  
DESCRIPTION = "FIFO RAM address when trigger occurred (hex value, 4 bytes)"

END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "FIFO\_BURST\_OFF"  
DATA\_TYPE = CHARACTER  
START\_BYTE = 140  
BYTES = 8  
UNIT = "N/A"  
FORMAT = "A8"  
DESCRIPTION = "FIFO RAM address when recording stopped (hex value, 4 bytes)"

END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "FIFO\_FIRST\_DAT"  
DATA\_TYPE = CHARACTER  
START\_BYTE = 151  
BYTES = 8  
UNIT = "N/A"  
FORMAT = "A8"  
DESCRIPTION = "FIFO RAM address of very first channel"

```
data (hex value, 4 bytes)"
END_OBJECT = COLUMN

OBJECT = COLUMN
  NAME = "NSAMP"
  DATA_TYPE = ASCII_INTEGER
  START_BYTE = 161
  BYTES = 10
  FORMAT = "I10"
  UNIT = "N/A"
  DESCRIPTION = "Number of samples per channel in telemetry"
END_OBJECT = COLUMN

OBJECT = COLUMN
  NAME = "TEMP_FOOT-Y_TRM"
  DATA_TYPE = ASCII_INTEGER
  START_BYTE = 172
  BYTES = 5
  FORMAT = "I5"
  UNIT = "MILLIVOLT"
  MISSING_CONSTANT = 99999
  DESCRIPTION = "-Y_Foot TRM temperature before measurement"
END_OBJECT = COLUMN

OBJECT = COLUMN
  NAME = "TEMP_FOOT-Y_ACC"
  DATA_TYPE = ASCII_INTEGER
  START_BYTE = 178
  BYTES = 5
  FORMAT = "I5"
  UNIT = "MILLIVOLT"
  MISSING_CONSTANT = 99999
  DESCRIPTION = "-Y_Foot ACC temperature before measurement"
END_OBJECT = COLUMN

OBJECT = COLUMN
  NAME = "TEMP_FOOT+X_TRM"
  DATA_TYPE = ASCII_INTEGER
  START_BYTE = 184
  BYTES = 5
  FORMAT = "I5"
  UNIT = "MILLIVOLT"
  MISSING_CONSTANT = 99999
  DESCRIPTION = "+X_Foot TRM temperature before measurement"
END_OBJECT = COLUMN

OBJECT = COLUMN
  NAME = "TEMP_FOOT+X_ACC"
  DATA_TYPE = ASCII_INTEGER
  START_BYTE = 190
  BYTES = 5
  FORMAT = "I5"
  UNIT = "MILLIVOLT"
```

```
MISSING_CONSTANT = 99999
DESCRIPTION      = "+X_Foot ACC temperature before measurement"
END_OBJECT      = COLUMN
```

```
OBJECT          = COLUMN
NAME           = "TEMP_FOOT+Y_TRM"
DATA_TYPE      = ASCII_INTEGER
START_BYTE     = 196
BYTES          = 5
FORMAT         = "I5"
UNIT           = "MILLIVOLT"
MISSING_CONSTANT = 99999
DESCRIPTION    = "+Y_Foot TRM temperature before measurement"
END_OBJECT     = COLUMN
```

```
OBJECT          = COLUMN
NAME           = "TEMP_FOOT+Y_ACC"
DATA_TYPE      = ASCII_INTEGER
START_BYTE     = 202
BYTES          = 5
FORMAT         = "I5"
UNIT           = "MILLIVOLT"
MISSING_CONSTANT = 99999
DESCRIPTION    = "+Y_Foot ACC temperature before measurement"
END_OBJECT     = COLUMN
```

```
OBJECT          = COLUMN
NAME           = "CASSE_PCB_TEMP"
DATA_TYPE      = ASCII_INTEGER
START_BYTE     = 208
BYTES          = 5
FORMAT         = "I5"
UNIT           = "MILLIVOLT"
MISSING_CONSTANT = 99999
DESCRIPTION    = "CASSE PCB temperature"
END_OBJECT     = COLUMN
```

```
OBJECT          = COLUMN
NAME           = "RADFET_VOLTAGE"
DATA_TYPE      = ASCII_INTEGER
START_BYTE     = 214
BYTES          = 5
FORMAT         = "I5"
UNIT           = "MILLIVOLT"
MISSING_CONSTANT = 99999
DESCRIPTION    = "RadFET voltage (0.002 V/mV)"
END_OBJECT     = COLUMN
```

#### 4.3.2.4.1.2.4 CASSE Data definition

The data produced in sounding or listening modes are described by the following TABLE object.

```
OBJECT          = DATA_TABLE
NAME           = "DATA"
```

```
INTERCHANGE_FORMAT      = ASCII
ROWS                    = 16438
COLUMNS                = 26
ROW_BYTES               = 231
^STRUCTURE              = "CAS_DATA2.FMT"
END_OBJECT              = DATA_TABLE
```

The structure of the measured data TABLE object is defined in the file CAS\_DATA2.FMT-

```
OBJECT                  = COLUMN
  NAME                  = "SESAME_SEQ_ID"
  DATA_TYPE            = ASCII_INTEGER
  START_BYTE           = 1
  BYTES                 = 6
  UNIT                  = "N/A"
  FORMAT                = "I6"
  DESCRIPTION           = "Sequence ID in the current data file"
END_OBJECT              = COLUMN
```

```
OBJECT                  = COLUMN
  NAME                  = "MEAS_ID"
  DATA_TYPE            = ASCII_INTEGER
  START_BYTE           = 8
  BYTES                 = 6
  FORMAT                = "I6"
  UNIT                  = "N/A"
  DESCRIPTION           = "Measurement ID in the current sequence"
END_OBJECT              = COLUMN
```

```
OBJECT                  = COLUMN
  NAME                  = "RELATIVE_TIME_1"
  DATA_TYPE            = ASCII_REAL
  START_BYTE           = 15
  BYTES                 = 10
  UNIT                  = "MILLISECOND"
  FORMAT                = "F10.3"
  MISSING_CONSTANT     = 99999.999
  DESCRIPTION           = "Channel 1 time relative to
                          start time of the measurement"
END_OBJECT              = COLUMN
```

```
OBJECT                  = COLUMN
  NAME                  = "CHANNEL_1"
  DATA_TYPE            = ASCII_INTEGER
  START_BYTE           = 26
  BYTES                 = 6
  FORMAT                = "I6"
  UNIT                  = "N/A"
  MISSING_CONSTANT     = 999999
  DESCRIPTION           = "Channel data :
                          - non-linear ADC units for regular (non-stacked)
                            channel data block
                          - linearized stacked ADC units for stacked channel
```

data block

The mode (stacked or regular) is given in the  
 job card file (JOBCL)"

END\_OBJECT = COLUMN

OBJECT = COLUMN  
 NAME = "RELATIVE\_TIME\_2"  
 DATA\_TYPE = ASCII\_REAL  
 START\_BYTE = 33  
 BYTES = 10  
 UNIT = "MILLISECOND"  
 FORMAT = "F10.3"  
 MISSING\_CONSTANT = 99999.999  
 DESCRIPTION = "Channel 2 time relative to  
 start time of the measurement"

END\_OBJECT = COLUMN

OBJECT = COLUMN  
 NAME = "CHANNEL\_2"  
 DATA\_TYPE = ASCII\_INTEGER  
 START\_BYTE = 44  
 BYTES = 6  
 FORMAT = "I6"  
 UNIT = "N/A"  
 MISSING\_CONSTANT = 999999  
 DESCRIPTION = "Channel data :  
 - non-linear ADC units for regular (non-stacked)  
 channel data block  
 - linearized stacked ADC units for stacked channel  
 data block

The mode (stacked or regular) is given in the  
 job card file (JOBCL)"

END\_OBJECT = COLUMN

OBJECT = COLUMN  
 NAME = "RELATIVE\_TIME\_3"  
 DATA\_TYPE = ASCII\_REAL  
 START\_BYTE = 51  
 BYTES = 10  
 UNIT = "MILLISECOND"  
 FORMAT = "F10.3"  
 MISSING\_CONSTANT = 99999.999  
 DESCRIPTION = "Channel 3 time relative to  
 start time of the measurement"

END\_OBJECT = COLUMN

OBJECT = COLUMN  
 NAME = "CHANNEL\_3"  
 DATA\_TYPE = ASCII\_INTEGER  
 START\_BYTE = 62  
 BYTES = 6  
 FORMAT = "I6"  
 UNIT = "N/A"

```
MISSING_CONSTANT = 999999
DESCRIPTION      = "Channel data :
                  - non-linear ADC units for regular (non-stacked)
                    channel data block
                  - linearized stacked ADC units for stacked channel
                    data block
                  The mode (stacked or regular) is given in the
                  job card file (JOBC)"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
NAME           = "RELATIVE_TIME_4"
DATA_TYPE      = ASCII_REAL
START_BYTE     = 69
BYTES         = 10
UNIT          = "MILLISECOND"
FORMAT        = "F10.3"
MISSING_CONSTANT = 99999.999
DESCRIPTION    = "Channel 4 time relative to
                  start time of the measurement"
END_OBJECT     = COLUMN

OBJECT          = COLUMN
NAME           = "CHANNEL_4"
DATA_TYPE      = ASCII_INTEGER
START_BYTE     = 80
BYTES         = 6
UNIT          = "N/A"
FORMAT        = "I6"
MISSING_CONSTANT = 999999
DESCRIPTION    = "Channel data :
                  - non-linear ADC units for regular (non-stacked)
                    channel data block
                  - linearized stacked ADC units for stacked channel
                    data block
                  The mode (stacked or regular) is given in the
                  job card file (JOBC)"
END_OBJECT     = COLUMN

OBJECT          = COLUMN
NAME           = "RELATIVE_TIME_5"
DATA_TYPE      = ASCII_REAL
START_BYTE     = 87
BYTES         = 10
UNIT          = "MILLISECOND"
FORMAT        = "F10.3"
MISSING_CONSTANT = 99999.999
DESCRIPTION    = "Channel 5 time relative to
                  start time of the measurement"
END_OBJECT     = COLUMN

OBJECT          = COLUMN
NAME           = "CHANNEL_5"
```



```
DATA_TYPE      = ASCII_INTEGER
START_BYTE     = 98
BYTES         = 6
FORMAT        = "I6"
UNIT          = "N/A"
MISSING_CONSTANT = 999999
DESCRIPTION    = "Channel data :
                - non-linear ADC units for regular (non-stacked)
                  channel data block
                - linearized stacked ADC units for stacked channel
                  data block
                The mode (stacked or regular) is given in the
                job card file (JOBC)"
END_OBJECT    = COLUMN

OBJECT        = COLUMN
NAME         = "RELATIVE_TIME_6"
DATA_TYPE    = ASCII_REAL
START_BYTE   = 105
BYTES       = 10
UNIT        = "MILLISECOND"
FORMAT     = "F10.3"
MISSING_CONSTANT = 99999.999
DESCRIPTION = "Channel 6 time relative to
                start time of the measurement"
END_OBJECT  = COLUMN

OBJECT        = COLUMN
NAME         = "CHANNEL_6"
DATA_TYPE    = ASCII_INTEGER
START_BYTE   = 116
BYTES       = 6
FORMAT     = "I6"
UNIT        = "N/A"
MISSING_CONSTANT = 999999
DESCRIPTION  = "Channel data :
                - non-linear ADC units for regular (non-stacked)
                  channel data block
                - linearized stacked ADC units for stacked channel
                  data block
                The mode (stacked or regular) is given in the
                job card file (JOBC)"
END_OBJECT  = COLUMN

OBJECT        = COLUMN
NAME         = "RELATIVE_TIME_7"
DATA_TYPE    = ASCII_REAL
START_BYTE   = 123
BYTES       = 10
UNIT        = "MILLISECOND"
FORMAT     = "F10.3"
MISSING_CONSTANT = 99999.999
DESCRIPTION  = "Channel 7 time relative to
```

```
                                start time of the measurement"
END_OBJECT                      = COLUMN

OBJECT                          = COLUMN
  NAME                          = "CHANNEL_7"
  DATA_TYPE                    = ASCII_INTEGER
  START_BYTE                    = 134
  BYTES                          = 6
  FORMAT                        = "I6"
  UNIT                          = "N/A"
  MISSING_CONSTANT              = 999999
  DESCRIPTION                    = "Channel data :
                                - non-linear ADC units for regular (non-stacked)
                                  channel data block
                                - linearized stacked ADC units for stacked channel
                                  data block
                                The mode (stacked or regular) is given in the
                                job card file (JOBCL)"
END_OBJECT                      = COLUMN

OBJECT                          = COLUMN
  NAME                          = "RELATIVE_TIME_8"
  DATA_TYPE                    = ASCII_REAL
  START_BYTE                    = 141
  BYTES                          = 10
  UNIT                          = "MILLISECOND"
  FORMAT                        = "F10.3"
  MISSING_CONSTANT              = 99999.999
  DESCRIPTION                    = "Channel 8 time relative to
                                start time of the measurement"
END_OBJECT                      = COLUMN

OBJECT                          = COLUMN
  NAME                          = "CHANNEL_8"
  DATA_TYPE                    = ASCII_INTEGER
  START_BYTE                    = 152
  BYTES                          = 6
  FORMAT                        = "I6"
  UNIT                          = "N/A"
  MISSING_CONSTANT              = 999999
  DESCRIPTION                    = "Channel data :
                                - non-linear ADC units for regular (non-stacked)
                                  channel data block
                                - linearized stacked ADC units for stacked channel
                                  data block
                                The mode (stacked or regular) is given in the
                                job card file (JOBCL)"
END_OBJECT                      = COLUMN

OBJECT                          = COLUMN
  NAME                          = "RELATIVE_TIME_9"
  DATA_TYPE                    = ASCII_REAL
  START_BYTE                    = 159
```

```

    BYTES           = 10
    UNIT            = "MILLISECOND"
    FORMAT          = "F10.3"
    MISSING_CONSTANT = 99999.999
    DESCRIPTION     = "Channel 9 time relative to
                      start time of the measurement"
END_OBJECT        = COLUMN

OBJECT            = COLUMN
  NAME            = "CHANNEL_9"
  DATA_TYPE      = ASCII_INTEGER
  START_BYTE      = 170
  BYTES           = 6
  FORMAT          = "I6"
  UNIT            = "N/A"
  MISSING_CONSTANT = 999999
  DESCRIPTION     = "Channel data :
                    - non-linear ADC units for regular (non-stacked)
                      channel data block
                    - linearized stacked ADC units for stacked channel
                      data block
                    The mode (stacked or regular) is given in the
                    job card file (JOBBC)"
END_OBJECT        = COLUMN

OBJECT            = COLUMN
  NAME            = "RELATIVE_TIME_10"
  DATA_TYPE      = ASCII_REAL
  START_BYTE      = 177
  BYTES           = 10
  UNIT            = "MILLISECOND"
  FORMAT          = "F10.3"
  MISSING_CONSTANT = 99999.999
  DESCRIPTION     = "Channel 10 time relative to
                      start time of the measurement"
END_OBJECT        = COLUMN

OBJECT            = COLUMN
  NAME            = "CHANNEL_10"
  DATA_TYPE      = ASCII_INTEGER
  START_BYTE      = 188
  BYTES           = 6
  FORMAT          = "I6"
  UNIT            = "N/A"
  MISSING_CONSTANT = 999999
  DESCRIPTION     = "Channel data :
                    - non-linear ADC units for regular (non-stacked)
                      channel data block
                    - linearized stacked ADC units for stacked channel
                      data block
                    The mode (stacked or regular) is given in the
                    job card file (JOBBC)"
END_OBJECT        = COLUMN

```

OBJECT = COLUMN  
NAME = "RELATIVE\_TIME\_11"  
DATA\_TYPE = ASCII\_REAL  
START\_BYTE = 195  
BYTES = 10  
UNIT = "MILLISECOND"  
FORMAT = "F10.3"  
MISSING\_CONSTANT = 99999.999  
DESCRIPTION = "Channel 11 time relative to  
start time of the measurement"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "CHANNEL\_11"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 206  
BYTES = 6  
FORMAT = "I6"  
UNIT = "N/A"  
MISSING\_CONSTANT = 999999  
DESCRIPTION = "Channel data :  
- non-linear ADC units for regular (non-stacked)  
channel data block  
- linearized stacked ADC units for stacked channel  
data block  
The mode (stacked or regular) is given in the  
job card file (JOBCL)"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "RELATIVE\_TIME\_12"  
DATA\_TYPE = ASCII\_REAL  
START\_BYTE = 213  
BYTES = 10  
UNIT = "MILLISECOND"  
FORMAT = "F10.3"  
MISSING\_CONSTANT = 99999.999  
DESCRIPTION = "Channel 12 time relative to  
start time of the measurement"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "CHANNEL\_12"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 224  
BYTES = 6  
FORMAT = "I6"  
UNIT = "N/A"  
MISSING\_CONSTANT = 999999  
DESCRIPTION = "Channel data :  
- non-linear ADC units for regular (non-stacked)  
channel data block

```
- linearized stacked ADC units for stacked channel
  data block
The mode (stacked or regular) is given in the
job card file (JOBCL)
```

```
END_OBJECT          = COLUMN
```

#### 4.3.2.4.2 DIM object definitions

The structures of DIM measurements differ according to flight software versions. The details concerning the telemetry formats can be found in [AD1] for flight software version 1 (FM1), in [AD2] for flight software version 2 (FM2) and in [AD3] for flight software version 3 (FM3). The FM2 software was uploaded on 2007-09-24 at 19h40 UTC (during Payload Checkout #6). The FM3 software was uploaded on 2009-09-24 at 02h00 UTC (during PC#10).

##### 4.3.2.4.2.1 Flight software versions FM1 and FM2

###### 4.3.2.4.2.1.1 DIM Health Check object definition

The DIM Health Check (HC) data are organized as tables corresponding to different modes: “calibration”, “noise test”, “power check” and “sensor test”.

###### 4.3.2.4.2.1.1.1 DIM HC Calibration mode

The calibration mode is described by a TABLE object.

```
OBJECT              = CAL_TABLE
NAME                = "CAL"
INTERCHANGE_FORMAT = ASCII
ROWS                = 4
COLUMNS            = 9
ROW_BYTES           = 74
^STRUCTURE          = "DIM_CA.FMT"
END_OBJECT          = CAL_TABLE
```

The structure of the TABLE object is defined in the file DIM\_CA.FMT.

```
OBJECT              = COLUMN
NAME                = "UTC"
DATA_TYPE           = TIME
START_BYTE          = 1
BYTES               = 23
DESCRIPTION          = "Measurement start time (UTC in PDS standard
                        format YYYY-MM-DDThh:mm:ss.sss) "
END_OBJECT          = COLUMN
```

```
OBJECT              = COLUMN
NAME                = "SESAME_LOCAL_TIME"
DATA_TYPE           = ASCII_INTEGER
START_BYTE          = 25
BYTES               = 15
FORMAT              = "I15"
DESCRIPTION          = "Measurement start time. SESAME local time
                        (SLT) runs with a resolution of 1/32 seconds.
                        SLT represents the least significant 32 bits
                        of LOBT. The most significant 5 bits are in
                        CDMS RSST (see SESAME Ready Message) "
```

END\_OBJECT = COLUMN

OBJECT = COLUMN

NAME = "MARGIN"

DATA\_TYPE = ASCII\_INTEGER

START\_BYTE = 41

BYTES = 2

FORMAT = "I2"

UNIT = "DECIBEL"

MISSING\_CONSTANT = 99

DESCRIPTION = "DIM calibration margin"

END\_OBJECT = COLUMN

OBJECT = COLUMN

NAME = "LEVEL"

DATA\_TYPE = CHARACTER

START\_BYTE = 45

BYTES = 4

FORMAT = "A4"

UNIT = "N/A"

MISSING\_CONSTANT = "9999"

DESCRIPTION = "DIM calibration level values can be: low or high"

END\_OBJECT = COLUMN

OBJECT = COLUMN

NAME = "COUNTS"

DATA\_TYPE = ASCII\_INTEGER

START\_BYTE = 51

BYTES = 6

FORMAT = "I6"

UNIT = "N/A"

MISSING\_CONSTANT = 999999

DESCRIPTION = "DIM calibration timer counts"

END\_OBJECT = COLUMN

OBJECT = COLUMN

NAME = "PEAK\_MV"

DATA\_TYPE = ASCII\_INTEGER

START\_BYTE = 58

BYTES = 4

UNIT = "MILLIVOLT"

FORMAT = "I4"

MISSING\_CONSTANT = 9999

DESCRIPTION = "Peak voltage in mV"

END\_OBJECT = COLUMN

OBJECT = COLUMN

NAME = "TIME\_DB"

DATA\_TYPE = ASCII\_INTEGER

START\_BYTE = 63

BYTES = 2

UNIT = "DECIBEL"

FORMAT = "I2"

```

MISSING_CONSTANT      = 99
DESCRIPTION           = "Timer counts in compressed format"
END_OBJECT            = COLUMN
  
```

```

OBJECT                = COLUMN
  NAME                 = "PEAK_DB"
  DATA_TYPE           = ASCII_INTEGER
  START_BYTE          = 66
  BYTES                = 2
  UNIT                 = "DECIBEL"
  FORMAT              = "I2"
  MISSING_CONSTANT    = 99
  DESCRIPTION         = "Peak voltage in dB"
END_OBJECT            = COLUMN
  
```

```

OBJECT                = COLUMN
  NAME                 = "ERROR_CODE"
  DATA_TYPE           = CHARACTER
  START_BYTE          = 70
  BYTES                = 2
  FORMAT              = "A2"
  UNIT                 = "N/A"
  MISSING_CONSTANT    = "99"
  DESCRIPTION         = "DIM calibration error code,
                        2 hexadecimal characters"
END_OBJECT            = COLUMN
  
```

#### 4.3.2.4.2.1.1.2 DIM HC Noise Test mode

The noise test mode is described by the following TABLE object.

```

OBJECT                = NT_TABLE
  NAME                 = "NT"
  INTERCHANGE_FORMAT  = ASCII
  ROWS                 = 2
  COLUMNS             = 4
  ROW_BYTES           = 49
  ^STRUCTURE          = "DIM_NT.FMT"
END_OBJECT            = NT_TABLE
  
```

The structure of the "Noise Test" TABLE object is defined in the file DIM\_NT.FMT.

```

OBJECT                = COLUMN
  NAME                 = "UTC"
  DATA_TYPE           = TIME
  START_BYTE          = 1
  BYTES                = 23
  DESCRIPTION         = "Measurement start time (UTC in PDS standard
                        format YYYY-MM-DDThh:mm:ss.sss) "
END_OBJECT            = COLUMN
  
```

```

OBJECT                = COLUMN
  NAME                 = "SESAME_LOCAL_TIME"
  
```

```

DATA_TYPE           = ASCII_INTEGER
START_BYTE         = 25
BYTES              = 15
FORMAT             = "I15"
DESCRIPTION        = "Measurement start time. SESAME local time
                      (SLT) runs with a resolution of 1/32 seconds.
                      SLT represents the least significant 32 bits
                      of LOBT. The most significant 5 bits are in
                      CDMS RSST (see SESAME Ready Message)"
END_OBJECT        = COLUMN

OBJECT             = COLUMN
NAME              = "MARGIN"
DATA_TYPE         = ASCII_INTEGER
START_BYTE         = 41
BYTES              = 2
FORMAT            = "I2"
UNIT              = "DECIBEL"
MISSING_CONSTANT  = 99
DESCRIPTION        = "Noise test margin"
END_OBJECT        = COLUMN

OBJECT             = COLUMN
NAME              = "ERROR_CODE"
DATA_TYPE         = CHARACTER
START_BYTE         = 45
BYTES              = 2
FORMAT            = "A2"
UNIT              = "N/A"
MISSING_CONSTANT  = "99"
DESCRIPTION        = "DIM NT error code, 2 hexadecimal characters"
END_OBJECT        = COLUMN
  
```

#### 4.3.2.4.2.1.1.3 DIM HC Power Check mode

The data produced in power check mode are described by the following TABLE object.

```

OBJECT             = PC_TABLE
NAME              = "PC"
INTERCHANGE_FORMAT = ASCII
ROWS              = 2
COLUMNS          = 5
ROW_BYTES         = 64
^STRUCTURE        = "DIM_PC.FMT"
END_OBJECT        = PC_TABLE
  
```

The structure of the power check TABLE object is defined in the file DIM\_PC.FMT.

```

OBJECT             = COLUMN
NAME              = "UTC"
DATA_TYPE         = TIME
START_BYTE         = 1
BYTES              = 23
  
```



```
DESCRIPTION = "Measurement start time (UTC in PDS standard
              format YYYY-MM-DDThh:mm:ss.sss) "
END_OBJECT  = COLUMN

OBJECT      = COLUMN
  NAME      = "SESAME_LOCAL_TIME"
  DATA_TYPE = ASCII_INTEGER
  START_BYTE = 25
  BYTES     = 15
  FORMAT    = "I15"
  DESCRIPTION = "Measurement start time. SESAME local time
                (SLT) runs with a resolution of 1/32 seconds.
                SLT represents the least significant 32 bits
                of LOBT. The most significant 5 bits are in
                CDMS RSST (see SESAME Ready Message) "
END_OBJECT  = COLUMN

OBJECT      = COLUMN
  NAME      = "+5V"
  DATA_TYPE = ASCII_REAL
  START_BYTE = 41
  BYTES     = 8
  FORMAT    = "F8.3"
  UNIT      = VOLT
  MISSING_CONSTANT = 9999.999
  DESCRIPTION = "DIM +5V voltage"
END_OBJECT  = COLUMN

OBJECT      = COLUMN
  NAME      = "-5V"
  DATA_TYPE = ASCII_REAL
  START_BYTE = 50
  BYTES     = 8
  FORMAT    = "F8.3"
  UNIT      = VOLT
  MISSING_CONSTANT = 9999.999
  DESCRIPTION = "DIM -5V voltage"
END_OBJECT  = COLUMN

OBJECT      = COLUMN
  NAME      = "ERROR_CODE"
  DATA_TYPE = CHARACTER
  START_BYTE = 60
  BYTES     = 2
  FORMAT    = "A2"
  UNIT      = "N/A"
  MISSING_CONSTANT = "99"
  DESCRIPTION = "DIM PC error code, 2 hexadecimal characters"
END_OBJECT  = COLUMN
```

#### 4.3.2.4.2.1.1.4 DIM HC Sensor Test mode

Data acquired during sensor tests (X segment, Y segment and Z segment) are stored in ASCII tables with a common format. The segment name (X, Y or Z) appears in the label name.

The data produced in sensor test modes are described by the following TABLE object.

```

OBJECT          = ST_TABLE
  NAME          = "ST"
  INTERCHANGE_FORMAT = ASCII
  ROWS          = 2
  COLUMNS     = 11
  ROW_BYTES    = 79
  ^STRUCTURE   = "DIM_ST.FMT"
END_OBJECT     = ST_TABLE
  
```

The structure (format) of the "sensor test mode" TABLE object is defined in the file DIM\_ST.FMT.

```

OBJECT          = COLUMN
  NAME          = "UTC"
  DATA_TYPE    = TIME
  START_BYTE    = 1
  BYTES        = 23
  DESCRIPTION   = "Measurement start time (UTC in PDS standard
                  format YYYY-MM-DDThh:mm:ss.sss)"
END_OBJECT     = COLUMN
  
```

```

OBJECT          = COLUMN
  NAME          = "SESAME_LOCAL_TIME"
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 25
  BYTES        = 15
  FORMAT       = "I15"
  DESCRIPTION   = "Measurement start time. SESAME local time
                  (SLT) runs with a resolution of 1/32 seconds.
                  SLT represents the least significant 32 bits
                  of LOBT. The most significant 5 bits are in
                  CDMS RSST (see SESAME Ready Message)"
END_OBJECT     = COLUMN
  
```

```

OBJECT          = COLUMN
  NAME          = "DIRECTION"
  DATA_TYPE    = CHARACTER
  START_BYTE    = 42
  BYTES        = 1
  FORMAT       = "A1"
  UNIT         = "N/A"
  MISSING_CONSTANT = "9"
  DESCRIPTION   = "DIM sensor direction, can be X, Y or Z.
                  Echoed command parameter."
END_OBJECT     = COLUMN
  
```

```

OBJECT          = COLUMN
  NAME          = "MARGIN"
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 45
  
```

```
    BYTES = 2
    FORMAT = "I2"
    UNIT = "DECIBEL"
    MISSING_CONSTANT = 99
    DESCRIPTION = "DIM noise test margin"
END_OBJECT = COLUMN

OBJECT = COLUMN
    NAME = "ERROR_CODE"
    DATA_TYPE = CHARACTER
    START_BYTE = 49
    BYTES = 2
    FORMAT = "A2"
    UNIT = "N/A"
    MISSING_CONSTANT = "99"
    DESCRIPTION = "DIM sensor test error code,
                  2 hexadecimal characters"
END_OBJECT = COLUMN

OBJECT = COLUMN
    NAME = "AVG_MV"
    DATA_TYPE = ASCII_INTEGER
    START_BYTE = 53
    BYTES = 4
    FORMAT = "I4"
    UNIT = "MILLIVOLT"
    MISSING_CONSTANT = 9999
    DESCRIPTION = "DIM Average signal in mV"
END_OBJECT = COLUMN

OBJECT = COLUMN
    NAME = "PEAK_MV"
    DATA_TYPE = ASCII_INTEGER
    START_BYTE = 58
    BYTES = 4
    FORMAT = "I4"
    UNIT = "MILLIVOLT"
    MISSING_CONSTANT = 9999
    DESCRIPTION = "DIM Signal Peak voltage in mV"
END_OBJECT = COLUMN

OBJECT = COLUMN
    NAME = "COUNTS"
    DATA_TYPE = ASCII_INTEGER
    START_BYTE = 63
    BYTES = 6
    FORMAT = "I6"
    UNIT = "N/A"
    MISSING_CONSTANT = 999999
    DESCRIPTION = "DIM Timer counts"
END_OBJECT = COLUMN

OBJECT = COLUMN
```

```

NAME                = "AVG_DB"
DATA_TYPE           = ASCII_INTEGER
START_BYTE         = 70
BYTES              = 2
FORMAT             = "I2"
UNIT               = "DECIBEL"
MISSING_CONSTANT   = 99
DESCRIPTION        = "DIM Average signal in dB"
END_OBJECT         = COLUMN
  
```

```

OBJECT              = COLUMN
  NAME              = "PEAK_DB"
  DATA_TYPE       = ASCII_INTEGER
  START_BYTE      = 73
  BYTES           = 2
  FORMAT          = "I2"
  UNIT            = "DECIBEL"
  MISSING_CONSTANT = 99
  DESCRIPTION     = "DIM Signal Peak voltage in dB"
END_OBJECT         = COLUMN
  
```

```

OBJECT              = COLUMN
  NAME              = "TIME_DB"
  DATA_TYPE       = ASCII_INTEGER
  START_BYTE      = 76
  BYTES           = 2
  FORMAT          = "I2"
  UNIT            = "DECIBEL"
  MISSING_CONSTANT = 99
  DESCRIPTION     = "DIM impact time in compressed format"
END_OBJECT         = COLUMN
  
```

#### 4.3.2.4.2.1.2 DIM Average Test mode

During Average Test mode, average values of the signals for one sensor direction are taken at regular time intervals are stored in ASCII tables. The data are organized as ASCII tables. The measurement parameters are kept in a separate file (combined detached labels).

The measurement parameters in average test modes are described by the following TABLE object.

```

OBJECT              = DIM_AV_TEST_PAR_TABLE
  NAME              = "DIM_AV_TEST_PAR"
  INTERCHANGE_FORMAT = ASCII
  ROWS              = 22
  COLUMNS          = 11
  ROW_BYTES        = 103
  ^STRUCTURE       = "DIM_AVT_PAR.FMT"
END_OBJECT         = DIM_AV_TEST_PAR_TABLE
  
```

The structure of the "average test mode" TABLE object is defined in the file DIM\_AVT\_PAR.FMT.

```

OBJECT              = COLUMN
  NAME              = "SESAME_SEQ_ID"
  DATA_TYPE       = ASCII_INTEGER
  
```

```
START_BYTE      = 1
BYTES           = 6
FORMAT          = "I6"
UNIT            = "N/A"
DESCRIPTION     = "Sequence ID in the current data file"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
NAME            = "UTC"
DATA_TYPE       = TIME
START_BYTE      = 8
BYTES           = 23
DESCRIPTION     = "This column represents the UTC Time
                  for start of measurement"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
NAME            = "SESAME_LOCAL_TIME"
DATA_TYPE       = CHARACTER
START_BYTE      = 33
BYTES           = 15
FORMAT          = "A15"
UNIT            = "N/A"
DESCRIPTION     = "Start time of measurement represented as :
                  Reset number (integer starting at 1) / seconds
                  The time resolution is 0.03125 s"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
NAME            = "DIRECTION"
DATA_TYPE       = CHARACTER
START_BYTE      = 51
BYTES           = 1
UNIT            = "N/A"
FORMAT          = "A1"
DESCRIPTION     = "Direction in DIM coordinate system,
                  X, Y or Z.
                  Echoed command parameter."
END_OBJECT      = COLUMN

OBJECT          = COLUMN
NAME            = "ENERGY_CTRL"
DATA_TYPE       = CHARACTER
START_BYTE      = 55
BYTES           = 2
UNIT            = "N/A"
FORMAT          = "A2"
DESCRIPTION     = "Energy control,
                  00, 01 or 02.
                  Echoed command parameter."
END_OBJECT      = COLUMN

OBJECT          = COLUMN
```

```

NAME           = "MEAS_DURATION"
DATA_TYPE      = ASCII_INTEGER
START_BYTE    = 59
BYTES         = 5
UNIT          = "SECOND"
FORMAT        = "I5"
DESCRIPTION    = "Measurement duration.
                  Echoed command parameter."
END_OBJECT    = COLUMN
  
```

```

OBJECT        = COLUMN
NAME          = "N_SAMPLES"
DATA_TYPE     = ASCII_INTEGER
START_BYTE   = 65
BYTES        = 5
UNIT         = "N/A"
FORMAT       = "I5"
DESCRIPTION   = "Number of samples. "
END_OBJECT    = COLUMN
  
```

```

OBJECT        = COLUMN
NAME          = "TIME_STEP_ECHOED"
DATA_TYPE     = ASCII_INTEGER
START_BYTE   = 71
BYTES        = 5
UNIT         = "SECOND"
FORMAT       = "I5"
DESCRIPTION   = "Time step. Echoed parameter."
END_OBJECT    = COLUMN
  
```

```

OBJECT        = COLUMN
NAME          = "TIME_STEP_USED"
DATA_TYPE     = ASCII_INTEGER
START_BYTE   = 77
BYTES        = 5
UNIT         = "SECOND"
FORMAT       = "I5"
DESCRIPTION   = "Time step really used."
END_OBJECT    = COLUMN
  
```

The data produced in average test modes (signal) are described by the following TABLE object.

```

OBJECT        = DIM_AV_TEST_SIG_TABLE
NAME          = "DIM_AVT_SIG"
INTERCHANGE_FORMAT = ASCII
ROWS         =
COLUMNS     =
ROW_BYTES    =
^STRUCTURE   = " DIM_AVT_SIG.FMT"
END_OBJECT    = DIM_AV_TEST_SIG_TABLE
  
```

The structure of the "average test mode" TABLE object is defined in the file DIM\_AVT\_SIG.FMT-

```
OBJECT      = COLUMN
  NAME       = "SESAME_SEQ_ID"
  DATA_TYPE = ASCII_INTEGER
  START_BYTE = 1
  BYTES      = 6
  FORMAT     = "I6"
  UNIT       = "N/A"
  DESCRIPTION = "Sequence ID in the current data file"
END_OBJECT  = COLUMN
```

```
OBJECT      = COLUMN
  NAME       = "DIM_AM_TIME"
  DATA_TYPE = ASCII_INTEGER
  START_BYTE = 8
  BYTES      = 4
  UNIT       = "SECOND"
  FORMAT     = "I4"
  DESCRIPTION = "Time relative to start time
                in DIM_AV_PAR.FMT file"
END_OBJECT  = COLUMN
```

```
OBJECT      = COLUMN
  NAME       = "U_AV"
  DATA_TYPE = ASCII_INTEGER
  START_BYTE = 13
  BYTES      = 3
  UNIT       = "DECIBEL"
  FORMAT     = "I3"
  DESCRIPTION = "Average sample"
END_OBJECT  = COLUMN
```

#### 4.3.2.4.2.1.3 DIM Average mode

During Average mode, samples of the average signal voltage of one sensor face are taken at specified time intervals. The data are organized as ASCII tables. The measurement parameters are kept in a separate file (combined detached labels).

The measurement parameters in average modes are described by the following TABLE object.

```
OBJECT      = DIM_AV_PAR_TABLE
  NAME       = "DIM_AV_PAR"
  INTERCHANGE_FORMAT = ASCII
  ROWS       =
  COLUMNS   =
  ROW_BYTES  =
  ^STRUCTURE = "DIM_AV_PAR.FMT"
END_OBJECT  = DIM_AV_PAR_TABLE
```

The structure of the "average test mode" TABLE object is defined in the file DIM\_AV\_PAR.FMT.

```
OBJECT      = COLUMN
  NAME       = "SESAME_SEQ_ID"
  DATA_TYPE = ASCII_INTEGER
  START_BYTE = 1
```

BYTES = 6  
 FORMAT = "I6"  
 UNIT = "N/A"  
 DESCRIPTION = "Sequence ID in the current data file"  
 END\_OBJECT = COLUMN

OBJECT = COLUMN  
 NAME = "UTC"  
 DATA\_TYPE = TIME  
 START\_BYTE = 8  
 BYTES = 23  
 DESCRIPTION = "This column represents the UTC Time  
 for start of measurement"  
 END\_OBJECT = COLUMN

OBJECT = COLUMN  
 NAME = "SESAME\_LOCAL\_TIME"  
 DATA\_TYPE = CHARACTER  
 START\_BYTE = 33  
 BYTES = 15  
 FORMAT = "A15"  
 UNIT = "N/A"  
 DESCRIPTION = "Start time of measurement represented as :  
 Reset number (integer starting at 1) / seconds  
 The time resolution is 0.03125 s"  
 END\_OBJECT = COLUMN

OBJECT = COLUMN  
 NAME = "DIRECTION"  
 DATA\_TYPE = CHARACTER  
 START\_BYTE = 51  
 BYTES = 1  
 UNIT = "N/A"  
 FORMAT = "A1"  
 DESCRIPTION = "Direction in DIM coordinate system,  
 X, Y or Z.  
 Echoed command parameter."  
 END\_OBJECT = COLUMN

OBJECT = COLUMN  
 NAME = "ENERGY\_CTRL"  
 DATA\_TYPE = CHARACTER  
 START\_BYTE = 55  
 BYTES = 2  
 UNIT = "N/A"  
 FORMAT = "A2"  
 DESCRIPTION = "Energy control,  
 00, 01 or 02.  
 Echoed command parameter."  
 END\_OBJECT = COLUMN

OBJECT = COLUMN  
 NAME = "MEAS\_DURATION"



```
DATA_TYPE      = ASCII_INTEGER
START_BYTE     = 59
BYTES         = 5
UNIT          = "SECOND"
FORMAT        = "I5"
DESCRIPTION    = "Measurement duration.
                  Echoed command parameter."
END_OBJECT     = COLUMN
```

```
OBJECT         = COLUMN
NAME          = "N_SAMPLES"
DATA_TYPE     = ASCII_INTEGER
START_BYTE    = 65
BYTES        = 5
UNIT         = "N/A"
FORMAT       = "I5"
DESCRIPTION  = "Number of samples. "
END_OBJECT   = COLUMN
```

```
OBJECT         = COLUMN
NAME          = "TIME_STEP_ECHOED"
DATA_TYPE     = ASCII_INTEGER
START_BYTE    = 71
BYTES        = 5
UNIT         = "SECOND"
FORMAT       = "I5"
DESCRIPTION  = "Time step. Echoed parameter."
END_OBJECT   = COLUMN
```

```
OBJECT         = COLUMN
NAME          = "TIME_STEP_USED"
DATA_TYPE     = ASCII_INTEGER
START_BYTE    = 77
BYTES        = 5
UNIT         = "SECOND"
FORMAT       = "I5"
DESCRIPTION  = "Time step really used."
END_OBJECT   = COLUMN
```

The data produced in average modes (signal) are described by the following TABLE object.

```
OBJECT         = DIM_AV_SIG_TABLE
NAME          = "DIM_AV_SIG"
INTERCHANGE_FORMAT = ASCII
ROWS         =
COLUMNS     =
ROW_BYTES    =
^STRUCTURE   = "DIM_AV_SIG.FMT"
END_OBJECT   = DIM_AV_SIG_TABLE
```

The structure of the "average mode" TABLE object is defined in the file DIM\_AV\_SIG.FMT-

```
OBJECT         = COLUMN
```

```

NAME          = "SESAME_SEQ_ID"
DATA_TYPE     = ASCII_INTEGER
START_BYTE    = 1
BYTES         = 6
FORMAT        = "I6"
UNIT          = "N/A"
DESCRIPTION   = "Sequence ID in the current data file"
END_OBJECT    = COLUMN
  
```

```

OBJECT        = COLUMN
NAME          = "DIM_AM_TIME"
DATA_TYPE     = ASCII_INTEGER
START_BYTE    = 8
BYTES         = 4
UNIT          = "SECOND"
FORMAT        = "I4"
DESCRIPTION   = "Time relative to start time
                  in DIM_AV_PAR.FMT file"
END_OBJECT    = COLUMN
  
```

```

OBJECT        = COLUMN
NAME          = "U_AV"
DATA_TYPE     = ASCII_INTEGER
START_BYTE    = 13
BYTES         = 3
UNIT          = "DECIBEL"
FORMAT        = "I3"
DESCRIPTION   = "Average sample"
END_OBJECT    = COLUMN
  
```

#### 4.3.2.4.2.1.4 DIM Burst Continuous mode

Single events on one sensor face are registered. Measured values (peak amplitude U and impact time T) are stored on-board in a compressed way. First they are logarithmically scaled to  $1 \leq U[\text{dB}] \leq 90$  dB and  $10 \leq T[\text{dB}] \leq 70$  ( $10 \leq T[\text{dB}] \leq 90$  for version 1 of Flight Software). The counts for events with a particular (U[db], T[db]) combination are stored in memory cells of different sizes (one word, one byte, one nibble = 4 bit), depending on the expected frequency of such events. The resulting matrix of packed counts has a fixed size of 3585 Byte (independent of the actual number of events). Additionally average samples can be measured.

The DIM BC data are organized as (U,T) tables with dimensions (90,80), 1 to 90 for U and 10 to 90 for T. This corresponds to data produced with flight software version 1. For data obtained with versions 2 and 3 of flight software, the (U,T) table is filled with MISSING\_CONSTANT (defined in DIM\_BC\_BM.FMT).

The parameter data (general parameters, average mode parameters and burst mode parameters) associated with the BC measurement are kept in a separate file (combined detached labels).

Example: Burst continuous measurement (1 label file pointing to 3 data files)

- SES\_FS3\_DBC\_070929214512.LBL** (label)
- SES\_FS3\_DBC\_070929214512\_PAR.TAB (general parameters)
- SES\_FS3\_DBC\_070929214512\_AM.TAB (average mode, Uav time series)
- SES\_FS3\_DBC\_070929214512\_BM.TAB ((U,T) table)

The label contains the Start and Stop times of the measurement as LOBT and UTC.

#### DIM BC, Parameters table definition

The parameters table is the same for Burst Continuous Average mode and Burst mode.  
 The parameters are described in the following TABLE object.

```

OBJECT          = BC_PAR_TABLE
  NAME          = "BC_PAR"
  INTERCHANGE_FORMAT = ASCII
  ROWS          = 3
  COLUMNS      = 11
  ROW_BYTES     = 71
  ^STRUCTURE   = "DIM_BC_PAR.FMT"
END_OBJECT     = BC_PAR_TABLE
  
```

The structure of the TABLE object is defined in the file DIM\_BC\_PAR.FMT.

```

/* FILE_CONTENTS      = DIM Burst Continuous PAR data */
/*                   Flight software FM1, FM2, FM3, CODMAC level 2 */
/* FILE_NAME          = DIM_BC_PAR.FMT */
/* REVISION_NOTE      = H. Krueger, version 1, 2015-08-18 */
/*                   A. Hirn, version 2, 2015-11-20 */
  
```

```

OBJECT          = COLUMN
  NAME          = "SESAME_SEQ_ID"
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 1
  BYTES         = 6
  FORMAT        = "I6"
  UNIT          = "N/A"
  MISSING_CONSTANT = 999999
  DESCRIPTION   = "Sequence ID in the current data file"
END_OBJECT     = COLUMN
  
```

```

OBJECT          = COLUMN
  NAME          = "SESAME_LOCAL_TIME"
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 8
  BYTES         = 15
  FORMAT        = "I15"
  DESCRIPTION   = "Time at end of measuring period.
                  SESAME local time
                  (SLT) runs with a resolution of 1/32 seconds.
                  SLT represents the least significant 32 bits
                  of LOBT. The most significant 5 bits are in
                  CDMS RSST (see SESAME Ready Message)"
END_OBJECT     = COLUMN
  
```

```

OBJECT          = COLUMN
  NAME          = "DIRECTION"
  DATA_TYPE    = CHARACTER
  START_BYTE    = 25
  BYTES         = 1
  FORMAT        = "A1"
  UNIT          = "N/A"
  MISSING_CONSTANT = "9"
  
```

```

DESCRIPTION          = "Direction in DIM coordinate system, X, Y or Z.
                        Echoed command parameter."
END_OBJECT           = COLUMN

OBJECT               = COLUMN
  NAME                = "MARGIN"
  DATA_TYPE          = ASCII_INTEGER
  START_BYTE         = 28
  BYTES               = 2
  FORMAT              = "I2"
  UNIT                = "DECIBEL"
  MISSING_CONSTANT   = 99
  DESCRIPTION         = "The margin determines the detection
                        threshold of the measuring amplifier.
                        Echoed command parameter. "
END_OBJECT           = COLUMN

OBJECT               = COLUMN
  NAME                = "DECAY_TIME"
  DATA_TYPE          = ASCII_INTEGER
  START_BYTE         = 31
  BYTES               = 3
  FORMAT              = "I3"
  UNIT                = "MILLISECOND"
  MISSING_CONSTANT   = 999
  DESCRIPTION         = "Signal decay time.
                        Range from 0 to 255.
                        Echoed command parameter."
END_OBJECT           = COLUMN

OBJECT               = COLUMN
  NAME                = "SAMPLING_INTERVAL"
  DATA_TYPE          = ASCII_INTEGER
  START_BYTE         = 35
  BYTES               = 5
  FORMAT              = "I5"
  UNIT                = "SECOND"
  MISSING_CONSTANT   = 99999
  DESCRIPTION         = "Sampling time interval.
                        Echoed command parameter."
END_OBJECT           = COLUMN

OBJECT               = COLUMN
  NAME                = "MEAS_TIME"
  DATA_TYPE          = ASCII_INTEGER
  START_BYTE         = 41
  BYTES               = 5
  FORMAT              = "I5"
  UNIT                = "SECOND"
  MISSING_CONSTANT   = 99999
  DESCRIPTION         = "Measuring time.
                        Echoed command parameter."
END_OBJECT           = COLUMN
  
```

```

OBJECT                = COLUMN
  NAME                = "NEVENT"
  DATA_TYPE          = ASCII_INTEGER
  START_BYTE          = 47
  BYTES                = 5
  FORMAT              = "I5"
  UNIT                = "N/A"
  MISSING_CONSTANT    = 99999
  DESCRIPTION         = "Number of events detected."
END_OBJECT            = COLUMN
  
```

```

OBJECT                = COLUMN
  NAME                = "N_FALSE_EVENTS"
  DATA_TYPE          = ASCII_INTEGER
  START_BYTE          = 53
  BYTES                = 5
  FORMAT              = "I5"
  UNIT                = "N/A"
  MISSING_CONSTANT    = 99999
  DESCRIPTION         = "Number of false events."
END_OBJECT            = COLUMN
  
```

```

OBJECT                = COLUMN
  NAME                = "N_LONG_EVENTS"
  DATA_TYPE          = ASCII_INTEGER
  START_BYTE          = 59
  BYTES                = 5
  FORMAT              = "I5"
  UNIT                = "N/A"
  MISSING_CONSTANT    = 99999
  DESCRIPTION         = "Number of long events."
END_OBJECT            = COLUMN
  
```

```

OBJECT                = COLUMN
  NAME                = "N_AV_SAMPLES"
  DATA_TYPE          = ASCII_INTEGER
  START_BYTE          = 65
  BYTES                = 5
  FORMAT              = "I5"
  UNIT                = "N/A"
  MISSING_CONSTANT    = 99999
  DESCRIPTION         = "Number of average samples."
END_OBJECT            = COLUMN
  
```

### DIM BC Average mode data definition

The average mode data are described in the following TABLE object.

```

OBJECT                = BC_AM_TABLE
  NAME                = "BC_AM"
  INTERCHANGE_FORMAT = ASCII
  ROWS                = 22
  
```

```
COLUMNS           = 3
ROW_BYTES          = 16
^STRUCTURE         = "DIM_BC_AM.FMT"
END_OBJECT         = BC_AM_TABLE
```

The structure of the TABLE object is defined in the file DIM\_BC\_AM.FMT.

```
OBJECT             = COLUMN
NAME               = "SESAME_SEQ_ID"
DATA_TYPE          = ASCII_INTEGER
START_BYTE         = 1
BYTES              = 6
FORMAT             = "I6"
UNIT               = "N/A"
MISSING_CONSTANT   = 999999
DESCRIPTION        = "Sequence ID in the current data file"
END_OBJECT         = COLUMN
```

```
OBJECT             = COLUMN
NAME               = "TIME"
DATA_TYPE          = ASCII_INTEGER
START_BYTE         = 8
BYTES              = 4
FORMAT             = "I4"
UNIT               = "SECOND"
MISSING_CONSTANT   = 9999
DESCRIPTION        = "Time relative to start time
                    in DIM_BM_PAR.FMT file"
END_OBJECT         = COLUMN
```

```
OBJECT             = COLUMN
NAME               = "U_AV"
DATA_TYPE          = ASCII_INTEGER
START_BYTE         = 13
BYTES              = 2
FORMAT             = "I2"
UNIT               = "DECIBEL"
MISSING_CONSTANT   = 99
DESCRIPTION        = "Average sample."
END_OBJECT         = COLUMN
```

### **DIM BC Burst mode data definition (FM 1)**

The burst continuous data are described in the following TABLE object.

```
OBJECT             = BURST_MODE_TABLE
NAME               = BURST_MODE
INTERCHANGE_FORMAT = ASCII
ROWS               = 3
COLUMNS           = 66
ROW_BYTES          = 247
^STRUCTURE         = "DIM_BC_BM_FM1.FMT"
END_OBJECT         = BURST_MODE_TABLE
```

The structure of the TABLE object is defined in the file DIM\_BC\_BM\_FM1.FMT.

```
OBJECT          = COLUMN
  NAME          = "SESAME_SEQ_ID"
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 1
  BYTES         = 6
  UNIT          = "N/A"
  FORMAT        = "I6"
  DESCRIPTION   = "Sequence ID in the current data file"
END_OBJECT      = COLUMN
```

```
OBJECT          = COLUMN
  NAME          = "CNT_1"
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 8
  BYTES         = 2
  UNIT          = "DECIBEL"
  FORMAT        = "I2"
  DESCRIPTION   = "Counts for impact time 1 dB
                  (time in compressed format)"
END_OBJECT      = COLUMN
```

```
OBJECT          = COLUMN
  NAME          = "CNT_2"
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 11
  BYTES         = 2
  UNIT          = "DECIBEL"
  FORMAT        = "I2"
  DESCRIPTION   = "Counts for impact time 2 dB
                  (time in compressed format)"
END_OBJECT      = COLUMN
```

```
OBJECT          = COLUMN
  NAME          = "CNT_3"
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 14
  BYTES         = 2
  UNIT          = "DECIBEL"
  FORMAT        = "I2"
  DESCRIPTION   = "Counts for impact time 3 dB
                  (time in compressed format)"
END_OBJECT      = COLUMN
```

```
OBJECT          = COLUMN
  NAME          = "CNT_4"
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 17
  BYTES         = 2
  UNIT          = "DECIBEL"
  FORMAT        = "I2"
  DESCRIPTION   = "Counts for impact time 4 dB
                  (time in compressed format)"
```

```
END_OBJECT          = COLUMN

OBJECT              = COLUMN
  NAME              = "CNT_5"
  DATA_TYPE        = ASCII_INTEGER
  START_BYTE        = 20
  BYTES              = 2
  UNIT              = "DECIBEL"
  FORMAT            = "I2"
  DESCRIPTION        = "Counts for impact time 5 dB
                       (time in compressed format)"
END_OBJECT          = COLUMN

OBJECT              = COLUMN
  NAME              = "CNT_6"
  DATA_TYPE        = ASCII_INTEGER
  START_BYTE        = 23
  BYTES              = 2
  UNIT              = "DECIBEL"
  FORMAT            = "I2"
  DESCRIPTION        = "Counts for impact time 6 dB
                       (time in compressed format)"
END_OBJECT          = COLUMN

OBJECT              = COLUMN
  NAME              = "CNT_7"
  DATA_TYPE        = ASCII_INTEGER
  START_BYTE        = 26
  BYTES              = 2
  UNIT              = "DECIBEL"
  FORMAT            = "I2"
  DESCRIPTION        = "Counts for impact time 7 dB
                       (time in compressed format)"
END_OBJECT          = COLUMN

OBJECT              = COLUMN
  NAME              = "CNT_8"
  DATA_TYPE        = ASCII_INTEGER
  START_BYTE        = 29
  BYTES              = 2
  UNIT              = "DECIBEL"
  FORMAT            = "I2"
  DESCRIPTION        = "Counts for impact time 8 dB
                       (time in compressed format)"
END_OBJECT          = COLUMN

OBJECT              = COLUMN
  NAME              = "CNT_9"
  DATA_TYPE        = ASCII_INTEGER
  START_BYTE        = 32
  BYTES              = 2
  UNIT              = "DECIBEL"
  FORMAT            = "I2"
```



```
DESCRIPTION = "Counts for impact time 9 dB
              (time in compressed format)"
END_OBJECT  = COLUMN

OBJECT      = COLUMN
  NAME      = "CNT_10"
  DATA_TYPE = ASCII_INTEGER
  START_BYTE = 35
  BYTES     = 2
  UNIT      = "DECIBEL"
  FORMAT    = "I2"
  DESCRIPTION = "Counts for impact time 10 dB
                (time in compressed format)"
END_OBJECT  = COLUMN

OBJECT      = COLUMN
  NAME      = "CNT_11"
  DATA_TYPE = ASCII_INTEGER
  START_BYTE = 38
  BYTES     = 2
  UNIT      = "DECIBEL"
  FORMAT    = "I2"
  DESCRIPTION = "Counts for impact time 11 dB
                (time in compressed format)"
END_OBJECT  = COLUMN

OBJECT      = COLUMN
  NAME      = "CNT_12"
  DATA_TYPE = ASCII_INTEGER
  START_BYTE = 41
  BYTES     = 2
  UNIT      = "DECIBEL"
  FORMAT    = "I2"
  DESCRIPTION = "Counts for impact time 12 dB
                (time in compressed format)"
END_OBJECT  = COLUMN

OBJECT      = COLUMN
  NAME      = "CNT_13"
  DATA_TYPE = ASCII_INTEGER
  START_BYTE = 44
  BYTES     = 2
  UNIT      = "DECIBEL"
  FORMAT    = "I2"
  DESCRIPTION = "Counts for impact time 13 dB
                (time in compressed format)"
END_OBJECT  = COLUMN

OBJECT      = COLUMN
  NAME      = "CNT_14"
  DATA_TYPE = ASCII_INTEGER
  START_BYTE = 47
  BYTES     = 2
```

```
UNIT = "DECIBEL"
FORMAT = "I2"
DESCRIPTION = "Counts for impact time 14 dB
(time in compressed format)"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "CNT_15"
DATA_TYPE = ASCII_INTEGER
START_BYTE = 50
BYTES = 2
UNIT = "DECIBEL"
FORMAT = "I2"
DESCRIPTION = "Counts for impact time 15 dB
(time in compressed format)"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "CNT_16"
DATA_TYPE = ASCII_INTEGER
START_BYTE = 53
BYTES = 2
UNIT = "DECIBEL"
FORMAT = "I2"
DESCRIPTION = "Counts for impact time 16 dB
(time in compressed format)"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "CNT_17"
DATA_TYPE = ASCII_INTEGER
START_BYTE = 56
BYTES = 2
UNIT = "DECIBEL"
FORMAT = "I2"
DESCRIPTION = "Counts for impact time 17 dB
(time in compressed format)"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "CNT_18"
DATA_TYPE = ASCII_INTEGER
START_BYTE = 59
BYTES = 2
UNIT = "DECIBEL"
FORMAT = "I2"
DESCRIPTION = "Counts for impact time 18 dB
(time in compressed format)"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "CNT_19"
DATA_TYPE = ASCII_INTEGER
```

```
START_BYTE = 62
BYTES = 2
UNIT = "DECIBEL"
FORMAT = "I2"
DESCRIPTION = "Counts for impact time 19 dB
(time in compressed format)"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "CNT_20"
DATA_TYPE = ASCII_INTEGER
START_BYTE = 65
BYTES = 2
UNIT = "DECIBEL"
FORMAT = "I2"
DESCRIPTION = "Counts for impact time 20 dB
(time in compressed format)"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "CNT_21"
DATA_TYPE = ASCII_INTEGER
START_BYTE = 68
BYTES = 2
UNIT = "DECIBEL"
FORMAT = "I2"
DESCRIPTION = "Counts for impact time 21 dB
(time in compressed format)"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "CNT_22"
DATA_TYPE = ASCII_INTEGER
START_BYTE = 71
BYTES = 2
UNIT = "DECIBEL"
FORMAT = "I2"
DESCRIPTION = "Counts for impact time 22 dB
(time in compressed format)"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "CNT_23"
DATA_TYPE = ASCII_INTEGER
START_BYTE = 74
BYTES = 2
UNIT = "DECIBEL"
FORMAT = "I2"
DESCRIPTION = "Counts for impact time 23 dB
(time in compressed format)"
END_OBJECT = COLUMN

OBJECT = COLUMN
```

```
NAME = "CNT_24"
DATA_TYPE = ASCII_INTEGER
START_BYTE = 77
BYTES = 2
UNIT = "DECIBEL"
FORMAT = "I2"
DESCRIPTION = "Counts for impact time 24 dB
(time in compressed format)"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "CNT_25"
DATA_TYPE = ASCII_INTEGER
START_BYTE = 80
BYTES = 2
UNIT = "DECIBEL"
FORMAT = "I2"
DESCRIPTION = "Counts for impact time 25 dB
(time in compressed format)"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "CNT_26"
DATA_TYPE = ASCII_INTEGER
START_BYTE = 83
BYTES = 2
UNIT = "DECIBEL"
FORMAT = "I2"
DESCRIPTION = "Counts for impact time 26 dB
(time in compressed format)"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "CNT_27"
DATA_TYPE = ASCII_INTEGER
START_BYTE = 86
BYTES = 2
UNIT = "DECIBEL"
FORMAT = "I2"
DESCRIPTION = "Counts for impact time 27 dB
(time in compressed format)"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "CNT_28"
DATA_TYPE = ASCII_INTEGER
START_BYTE = 89
BYTES = 2
UNIT = "DECIBEL"
FORMAT = "I2"
DESCRIPTION = "Counts for impact time 28 dB
(time in compressed format)"
END_OBJECT = COLUMN
```

OBJECT = COLUMN  
NAME = "CNT\_29"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 92  
BYTES = 2  
UNIT = "DECIBEL"  
FORMAT = "I2"  
DESCRIPTION = "Counts for impact time 29 dB  
(time in compressed format)"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "CNT\_30"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 95  
BYTES = 2  
UNIT = "DECIBEL"  
FORMAT = "I2"  
DESCRIPTION = "Counts for impact time 30 dB  
(time in compressed format)"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "CNT\_31"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 98  
BYTES = 2  
UNIT = "DECIBEL"  
FORMAT = "I2"  
DESCRIPTION = "Counts for impact time 31 dB  
(time in compressed format)"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "CNT\_32"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 101  
BYTES = 2  
UNIT = "DECIBEL"  
FORMAT = "I2"  
DESCRIPTION = "Counts for impact time 32 dB  
(time in compressed format)"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "CNT\_33"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 104  
BYTES = 2  
UNIT = "DECIBEL"  
FORMAT = "I2"  
DESCRIPTION = "Counts for impact time 33 dB"

```
(time in compressed format)"
END_OBJECT          = COLUMN

OBJECT              = COLUMN
  NAME              = "CNT_34"
  DATA_TYPE        = ASCII_INTEGER
  START_BYTE        = 107
  BYTES             = 2
  UNIT              = "DECIBEL"
  FORMAT            = "I2"
  DESCRIPTION       = "Counts for impact time 34 dB
(time in compressed format)"
END_OBJECT          = COLUMN

OBJECT              = COLUMN
  NAME              = "CNT_35"
  DATA_TYPE        = ASCII_INTEGER
  START_BYTE        = 110
  BYTES             = 2
  UNIT              = "DECIBEL"
  FORMAT            = "I2"
  DESCRIPTION       = "Counts for impact time 35 dB
(time in compressed format)"
END_OBJECT          = COLUMN

OBJECT              = COLUMN
  NAME              = "CNT_36"
  DATA_TYPE        = ASCII_INTEGER
  START_BYTE        = 113
  BYTES             = 2
  UNIT              = "DECIBEL"
  FORMAT            = "I2"
  DESCRIPTION       = "Counts for impact time 36 dB
(time in compressed format)"
END_OBJECT          = COLUMN

OBJECT              = COLUMN
  NAME              = "CNT_37"
  DATA_TYPE        = ASCII_INTEGER
  START_BYTE        = 116
  BYTES             = 2
  UNIT              = "DECIBEL"
  FORMAT            = "I2"
  DESCRIPTION       = "Counts for impact time 37 dB
(time in compressed format)"
END_OBJECT          = COLUMN

OBJECT              = COLUMN
  NAME              = "CNT_38"
  DATA_TYPE        = ASCII_INTEGER
  START_BYTE        = 119
  BYTES             = 2
  UNIT              = "DECIBEL"
```

```
FORMAT = "I2"
DESCRIPTION = "Counts for impact time 38 dB
(time in compressed format)"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "CNT_39"
DATA_TYPE = ASCII_INTEGER
START_BYTE = 122
BYTES = 2
UNIT = "DECIBEL"
FORMAT = "I2"
DESCRIPTION = "Counts for impact time 39 dB
(time in compressed format)"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "CNT_40"
DATA_TYPE = ASCII_INTEGER
START_BYTE = 125
BYTES = 2
UNIT = "DECIBEL"
FORMAT = "I2"
DESCRIPTION = "Counts for impact time 40 dB
(time in compressed format)"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "CNT_41"
DATA_TYPE = ASCII_INTEGER
START_BYTE = 128
BYTES = 2
UNIT = "DECIBEL"
FORMAT = "I2"
DESCRIPTION = "Counts for impact time 41 dB
(time in compressed format)"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "CNT_42"
DATA_TYPE = ASCII_INTEGER
START_BYTE = 131
BYTES = 2
UNIT = "DECIBEL"
FORMAT = "I2"
DESCRIPTION = "Counts for impact time 42 dB
(time in compressed format)"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "CNT_43"
DATA_TYPE = ASCII_INTEGER
START_BYTE = 134
```

```
    BYTES = 2
    UNIT = "DECIBEL"
    FORMAT = "I2"
    DESCRIPTION = "Counts for impact time 43 dB
(time in compressed format)"
END_OBJECT = COLUMN

OBJECT = COLUMN
    NAME = "CNT_44"
    DATA_TYPE = ASCII_INTEGER
    START_BYTE = 137
    BYTES = 2
    UNIT = "DECIBEL"
    FORMAT = "I2"
    DESCRIPTION = "Counts for impact time 44 dB
(time in compressed format)"
END_OBJECT = COLUMN

OBJECT = COLUMN
    NAME = "CNT_45"
    DATA_TYPE = ASCII_INTEGER
    START_BYTE = 140
    BYTES = 2
    UNIT = "DECIBEL"
    FORMAT = "I2"
    DESCRIPTION = "Counts for impact time 45 dB
(time in compressed format)"
END_OBJECT = COLUMN

OBJECT = COLUMN
    NAME = "CNT_46"
    DATA_TYPE = ASCII_INTEGER
    START_BYTE = 143
    BYTES = 2
    UNIT = "DECIBEL"
    FORMAT = "I2"
    DESCRIPTION = "Counts for impact time 46 dB
(time in compressed format)"
END_OBJECT = COLUMN

OBJECT = COLUMN
    NAME = "CNT_47"
    DATA_TYPE = ASCII_INTEGER
    START_BYTE = 146
    BYTES = 2
    UNIT = "DECIBEL"
    FORMAT = "I2"
    DESCRIPTION = "Counts for impact time 47 dB
(time in compressed format)"
END_OBJECT = COLUMN

OBJECT = COLUMN
    NAME = "CNT_48"
```



```
DATA_TYPE          = ASCII_INTEGER
START_BYTE         = 149
BYTES              = 2
UNIT               = "DECIBEL"
FORMAT             = "I2"
DESCRIPTION        = "Counts for impact time 48 dB
(time in compressed format)"
END_OBJECT         = COLUMN

OBJECT             = COLUMN
NAME               = "CNT_49"
DATA_TYPE          = ASCII_INTEGER
START_BYTE         = 152
BYTES              = 2
UNIT               = "DECIBEL"
FORMAT             = "I2"
DESCRIPTION        = "Counts for impact time 49 dB
(time in compressed format)"
END_OBJECT         = COLUMN

OBJECT             = COLUMN
NAME               = "CNT_50"
DATA_TYPE          = ASCII_INTEGER
START_BYTE         = 155
BYTES              = 2
UNIT               = "DECIBEL"
FORMAT             = "I2"
DESCRIPTION        = "Counts for impact time 50 dB
(time in compressed format)"
END_OBJECT         = COLUMN

OBJECT             = COLUMN
NAME               = "CNT_51"
DATA_TYPE          = ASCII_INTEGER
START_BYTE         = 158
BYTES              = 2
UNIT               = "DECIBEL"
FORMAT             = "I2"
DESCRIPTION        = "Counts for impact time 51 dB
(time in compressed format)"
END_OBJECT         = COLUMN

OBJECT             = COLUMN
NAME               = "CNT_52"
DATA_TYPE          = ASCII_INTEGER
START_BYTE         = 161
BYTES              = 2
UNIT               = "DECIBEL"
FORMAT             = "I2"
DESCRIPTION        = "Counts for impact time 52 dB
(time in compressed format)"
END_OBJECT         = COLUMN
```

OBJECT = COLUMN  
NAME = "CNT\_53"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 164  
BYTES = 2  
UNIT = "DECIBEL"  
FORMAT = "I2"  
DESCRIPTION = "Counts for impact time 53 dB  
(time in compressed format)"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "CNT\_54"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 167  
BYTES = 2  
UNIT = "DECIBEL"  
FORMAT = "I2"  
DESCRIPTION = "Counts for impact time 54 dB  
(time in compressed format)"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "CNT\_55"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 170  
BYTES = 2  
UNIT = "DECIBEL"  
FORMAT = "I2"  
DESCRIPTION = "Counts for impact time 55 dB  
(time in compressed format)"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "CNT\_56"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 173  
BYTES = 2  
UNIT = "DECIBEL"  
FORMAT = "I2"  
DESCRIPTION = "Counts for impact time 56 dB  
(time in compressed format)"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "CNT\_57"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 176  
BYTES = 2  
UNIT = "DECIBEL"  
FORMAT = "I2"  
DESCRIPTION = "Counts for impact time 57 dB  
(time in compressed format)"

```
END_OBJECT = COLUMN

OBJECT = COLUMN
  NAME = "CNT_58"
  DATA_TYPE = ASCII_INTEGER
  START_BYTE = 179
  BYTES = 2
  UNIT = "DECIBEL"
  FORMAT = "I2"
  DESCRIPTION = "Counts for impact time 58 dB
                (time in compressed format)"
END_OBJECT = COLUMN

OBJECT = COLUMN
  NAME = "CNT_59"
  DATA_TYPE = ASCII_INTEGER
  START_BYTE = 182
  BYTES = 2
  UNIT = "DECIBEL"
  FORMAT = "I2"
  DESCRIPTION = "Counts for impact time 59 dB
                (time in compressed format)"
END_OBJECT = COLUMN

OBJECT = COLUMN
  NAME = "CNT_60"
  DATA_TYPE = ASCII_INTEGER
  START_BYTE = 185
  BYTES = 2
  UNIT = "DECIBEL"
  FORMAT = "I2"
  DESCRIPTION = "Counts for impact time 60 dB
                (time in compressed format)"
END_OBJECT = COLUMN

OBJECT = COLUMN
  NAME = "CNT_61"
  DATA_TYPE = ASCII_INTEGER
  START_BYTE = 188
  BYTES = 2
  UNIT = "DECIBEL"
  FORMAT = "I2"
  DESCRIPTION = "Counts for impact time 61 dB
                (time in compressed format)"
END_OBJECT = COLUMN

OBJECT = COLUMN
  NAME = "CNT_62"
  DATA_TYPE = ASCII_INTEGER
  START_BYTE = 191
  BYTES = 2
  UNIT = "DECIBEL"
  FORMAT = "I2"
```

DESCRIPTION = "Counts for impact time 62 dB  
(time in compressed format)"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "CNT\_63"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 194  
BYTES = 2  
UNIT = "DECIBEL"  
FORMAT = "I2"  
DESCRIPTION = "Counts for impact time 63 dB  
(time in compressed format)"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "CNT\_64"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 197  
BYTES = 2  
UNIT = "DECIBEL"  
FORMAT = "I2"  
DESCRIPTION = "Counts for impact time 64 dB  
(time in compressed format)"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "CNT\_65"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 200  
BYTES = 2  
UNIT = "DECIBEL"  
FORMAT = "I2"  
DESCRIPTION = "Counts for impact time 65 dB  
(time in compressed format)"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "CNT\_66"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 203  
BYTES = 2  
UNIT = "DECIBEL"  
FORMAT = "I2"  
DESCRIPTION = "Counts for impact time 66 dB  
(time in compressed format)"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "CNT\_67"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 206  
BYTES = 2

```

UNIT          = "DECIBEL"
FORMAT        = "I2"
DESCRIPTION    = "Counts for impact time 67 dB
                  (time in compressed format)"
END_OBJECT    = COLUMN

OBJECT        = COLUMN
NAME          = "CNT_68"
DATA_TYPE     = ASCII_INTEGER
START_BYTE    = 209
BYTES         = 2
UNIT          = "DECIBEL"
FORMAT        = "I2"
DESCRIPTION    = "Counts for impact time 68 dB
                  (time in compressed format)"
END_OBJECT    = COLUMN

OBJECT        = COLUMN
NAME          = "CNT_69"
DATA_TYPE     = ASCII_INTEGER
START_BYTE    = 212
BYTES         = 2
UNIT          = "DECIBEL"
FORMAT        = "I2"
DESCRIPTION    = "Counts for impact time 69 dB
                  (time in compressed format)"
END_OBJECT    = COLUMN

OBJECT        = COLUMN
NAME          = "CNT_70"
DATA_TYPE     = ASCII_INTEGER
START_BYTE    = 215
BYTES         = 2
UNIT          = "DECIBEL"
FORMAT        = "I2"
DESCRIPTION    = "Counts for impact time 70 dB
                  (time in compressed format)"
END_OBJECT    = COLUMN

OBJECT        = COLUMN
NAME          = "CNT_71"
DATA_TYPE     = ASCII_INTEGER
START_BYTE    = 218
BYTES         = 2
UNIT          = "DECIBEL"
FORMAT        = "I2"
DESCRIPTION    = "Counts for impact time 71 dB
                  (time in compressed format)"
END_OBJECT    = COLUMN

OBJECT        = COLUMN
NAME          = "CNT_72"
DATA_TYPE     = ASCII_INTEGER
  
```

```
START_BYTE      = 221
BYTES           = 2
UNIT            = "DECIBEL"
FORMAT          = "I2"
DESCRIPTION     = "Counts for impact time 72 dB
                  (time in compressed format)"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
NAME            = "CNT_73"
DATA_TYPE       = ASCII_INTEGER
START_BYTE      = 224
BYTES           = 2
UNIT            = "DECIBEL"
FORMAT          = "I2"
DESCRIPTION     = "Counts for impact time 73 dB
                  (time in compressed format)"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
NAME            = "CNT_74"
DATA_TYPE       = ASCII_INTEGER
START_BYTE      = 227
BYTES           = 2
UNIT            = "DECIBEL"
FORMAT          = "I2"
DESCRIPTION     = "Counts for impact time 74 dB
                  (time in compressed format)"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
NAME            = "CNT_75"
DATA_TYPE       = ASCII_INTEGER
START_BYTE      = 230
BYTES           = 2
UNIT            = "DECIBEL"
FORMAT          = "I2"
DESCRIPTION     = "Counts for impact time 75 dB
                  (time in compressed format)"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
NAME            = "CNT_76"
DATA_TYPE       = ASCII_INTEGER
START_BYTE      = 233
BYTES           = 2
UNIT            = "DECIBEL"
FORMAT          = "I2"
DESCRIPTION     = "Counts for impact time 76 dB
                  (time in compressed format)"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
```

```
NAME = "CNT_77"
DATA_TYPE = ASCII_INTEGER
START_BYTE = 236
BYTES = 2
UNIT = "DECIBEL"
FORMAT = "I2"
DESCRIPTION = "Counts for impact time 77 dB
              (time in compressed format)"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "CNT_78"
DATA_TYPE = ASCII_INTEGER
START_BYTE = 239
BYTES = 2
UNIT = "DECIBEL"
FORMAT = "I2"
DESCRIPTION = "Counts for impact time 78 dB
              (time in compressed format)"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "CNT_79"
DATA_TYPE = ASCII_INTEGER
START_BYTE = 242
BYTES = 2
UNIT = "DECIBEL"
FORMAT = "I2"
DESCRIPTION = "Counts for impact time 79 dB
              (time in compressed format)"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "CNT_80"
DATA_TYPE = ASCII_INTEGER
START_BYTE = 245
BYTES = 2
UNIT = "DECIBEL"
FORMAT = "I2"
DESCRIPTION = "Counts for impact time 80 dB
              (time in compressed format)"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "CNT_81"
DATA_TYPE = ASCII_INTEGER
START_BYTE = 248
BYTES = 2
UNIT = "DECIBEL"
FORMAT = "I2"
DESCRIPTION = "Counts for impact time 81 dB
              (time in compressed format)"
END_OBJECT = COLUMN
```

OBJECT = COLUMN  
NAME = "CNT\_82"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 251  
BYTES = 2  
UNIT = "DECIBEL"  
FORMAT = "I2"  
DESCRIPTION = "Counts for impact time 82 dB  
(time in compressed format)"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "CNT\_83"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 254  
BYTES = 2  
UNIT = "DECIBEL"  
FORMAT = "I2"  
DESCRIPTION = "Counts for impact time 83 dB  
(time in compressed format)"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "CNT\_84"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 257  
BYTES = 2  
UNIT = "DECIBEL"  
FORMAT = "I2"  
DESCRIPTION = "Counts for impact time 84 dB  
(time in compressed format)"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "CNT\_85"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 260  
BYTES = 2  
UNIT = "DECIBEL"  
FORMAT = "I2"  
DESCRIPTION = "Counts for impact time 85 dB  
(time in compressed format)"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "CNT\_86"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 263  
BYTES = 2  
UNIT = "DECIBEL"  
FORMAT = "I2"  
DESCRIPTION = "Counts for impact time 86 dB



```

                                (time in compressed format)"
END_OBJECT                      = COLUMN

OBJECT                          = COLUMN
  NAME                          = "CNT_87"
  DATA_TYPE                    = ASCII_INTEGER
  START_BYTE                    = 266
  BYTES                         = 2
  UNIT                          = "DECIBEL"
  FORMAT                        = "I2"
  DESCRIPTION                    = "Counts for impact time 87 dB
                                (time in compressed format)"
END_OBJECT                      = COLUMN

OBJECT                          = COLUMN
  NAME                          = "CNT_88"
  DATA_TYPE                    = ASCII_INTEGER
  START_BYTE                    = 269
  BYTES                         = 2
  UNIT                          = "DECIBEL"
  FORMAT                        = "I2"
  DESCRIPTION                    = "Counts for impact time 88 dB
                                (time in compressed format)"
END_OBJECT                      = COLUMN

OBJECT                          = COLUMN
  NAME                          = "CNT_89"
  DATA_TYPE                    = ASCII_INTEGER
  START_BYTE                    = 272
  BYTES                         = 2
  UNIT                          = "DECIBEL"
  FORMAT                        = "I2"
  DESCRIPTION                    = "Counts for impact time 89 dB
                                (time in compressed format)"
END_OBJECT                      = COLUMN

OBJECT                          = COLUMN
  NAME                          = "CNT_90"
  DATA_TYPE                    = ASCII_INTEGER
  START_BYTE                    = 275
  BYTES                         = 2
  UNIT                          = "DECIBEL"
  FORMAT                        = "I2"
  DESCRIPTION                    = "Counts for impact time 90 dB
                                (time in compressed format)"
END_OBJECT                      = COLUMN

```

**DIM BC Burst mode data definition (FM 2)**

The burst continuous data are described in the following TABLE object.

```

OBJECT                          = BC_BM_TABLE
  NAME                          = "BC_BM"

```

```
INTERCHANGE_FORMAT = ASCII
ROWS                = 270
COLUMNS            = 62
ROW_BYTES           = 318
^STRUCTURE          = "DIM_BC_BM.FMT"
END_OBJECT          = BC_BM_TABLE
```

The structure of the TABLE object is defined in the file DIM\_BC\_BM.FMT.

```
OBJECT              = COLUMN
NAME                = "SESAME_SEQ_ID"
DATA_TYPE           = ASCII_INTEGER
START_BYTE          = 1
BYTES               = 6
FORMAT              = "I6"
UNIT                = "N/A"
MISSING_CONSTANT    = 999999
DESCRIPTION         = "Sequence ID in the current data file"
END_OBJECT          = COLUMN
```

```
OBJECT              = COLUMN
NAME                = "ERROR_CODE"
DATA_TYPE           = CHARACTER
START_BYTE          = 9
BYTES               = 2
FORMAT              = "A2"
UNIT                = "N/A"
MISSING_CONSTANT    = "99"
DESCRIPTION         = "DIM BC error code, 2 hexadecimal characters"
END_OBJECT          = COLUMN
```

```
OBJECT              = COLUMN
NAME                = "CNT_10"
DATA_TYPE           = ASCII_INTEGER
START_BYTE          = 13
BYTES               = 4
FORMAT              = "I4"
UNIT                = "N/A"
MISSING_CONSTANT    = 9999
DESCRIPTION         = "Event counts for impact time 10 dB."
END_OBJECT          = COLUMN
```

```
OBJECT              = COLUMN
NAME                = "CNT_11"
DATA_TYPE           = ASCII_INTEGER
START_BYTE          = 18
BYTES               = 4
FORMAT              = "I4"
UNIT                = "N/A"
MISSING_CONSTANT    = 9999
DESCRIPTION         = "Event counts for impact time 11 dB."
END_OBJECT          = COLUMN
```

```
OBJECT = COLUMN
  NAME = "CNT_12"
  DATA_TYPE = ASCII_INTEGER
  START_BYTE = 23
  BYTES = 4
  FORMAT = "I4"
  UNIT = "N/A"
  MISSING_CONSTANT = 9999
  DESCRIPTION = "Event counts for impact time 12 dB."
END_OBJECT = COLUMN
```

```
OBJECT = COLUMN
  NAME = "CNT_13"
  DATA_TYPE = ASCII_INTEGER
  START_BYTE = 28
  BYTES = 4
  FORMAT = "I4"
  UNIT = "N/A"
  MISSING_CONSTANT = 9999
  DESCRIPTION = "Event counts for impact time 13 dB."
END_OBJECT = COLUMN
```

```
OBJECT = COLUMN
  NAME = "CNT_14"
  DATA_TYPE = ASCII_INTEGER
  START_BYTE = 33
  BYTES = 4
  FORMAT = "I4"
  UNIT = "N/A"
  MISSING_CONSTANT = 9999
  DESCRIPTION = "Event counts for impact time 14 dB."
END_OBJECT = COLUMN
```

```
OBJECT = COLUMN
  NAME = "CNT_15"
  DATA_TYPE = ASCII_INTEGER
  START_BYTE = 38
  BYTES = 4
  FORMAT = "I4"
  UNIT = "N/A"
  MISSING_CONSTANT = 9999
  DESCRIPTION = "Event counts for impact time 15 dB."
END_OBJECT = COLUMN
```

```
OBJECT = COLUMN
  NAME = "CNT_16"
  DATA_TYPE = ASCII_INTEGER
  START_BYTE = 43
  BYTES = 4
  FORMAT = "I4"
  UNIT = "N/A"
  MISSING_CONSTANT = 9999
  DESCRIPTION = "Event counts for impact time 16 dB."
```

```
END_OBJECT          = COLUMN

OBJECT              = COLUMN
  NAME              = "CNT_17"
  DATA_TYPE        = ASCII_INTEGER
  START_BYTE        = 48
  BYTES             = 4
  FORMAT            = "I4"
  UNIT              = "N/A"
  MISSING_CONSTANT  = 9999
  DESCRIPTION       = "Event counts for impact time 17 dB."
END_OBJECT          = COLUMN

OBJECT              = COLUMN
  NAME              = "CNT_18"
  DATA_TYPE        = ASCII_INTEGER
  START_BYTE        = 53
  BYTES             = 4
  FORMAT            = "I4"
  UNIT              = "N/A"
  MISSING_CONSTANT  = 9999
  DESCRIPTION       = "Event counts for impact time 18 dB."
END_OBJECT          = COLUMN

OBJECT              = COLUMN
  NAME              = "CNT_19"
  DATA_TYPE        = ASCII_INTEGER
  START_BYTE        = 58
  BYTES             = 4
  FORMAT            = "I4"
  UNIT              = "N/A"
  MISSING_CONSTANT  = 9999
  DESCRIPTION       = "Event counts for impact time 19 dB."
END_OBJECT          = COLUMN

OBJECT              = COLUMN
  NAME              = "CNT_20"
  DATA_TYPE        = ASCII_INTEGER
  START_BYTE        = 63
  BYTES             = 4
  FORMAT            = "I4"
  UNIT              = "N/A"
  MISSING_CONSTANT  = 9999
  DESCRIPTION       = "Event counts for impact time 20 dB."
END_OBJECT          = COLUMN

OBJECT              = COLUMN
  NAME              = "CNT_21"
  DATA_TYPE        = ASCII_INTEGER
  START_BYTE        = 68
  BYTES             = 4
  FORMAT            = "I4"
  UNIT              = "N/A"
```

MISSING\_CONSTANT = 9999  
DESCRIPTION = "Event counts for impact time 21 dB."  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "CNT\_22"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 73  
BYTES = 4  
FORMAT = "I4"  
UNIT = "N/A"  
MISSING\_CONSTANT = 9999  
DESCRIPTION = "Event counts for impact time 22 dB."  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "CNT\_23"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 78  
BYTES = 4  
FORMAT = "I4"  
UNIT = "N/A"  
MISSING\_CONSTANT = 9999  
DESCRIPTION = "Event counts for impact time 23 dB."  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "CNT\_24"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 83  
BYTES = 4  
FORMAT = "I4"  
UNIT = "N/A"  
MISSING\_CONSTANT = 9999  
DESCRIPTION = "Event counts for impact time 24 dB."  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "CNT\_25"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 88  
BYTES = 4  
FORMAT = "I4"  
UNIT = "N/A"  
MISSING\_CONSTANT = 9999  
DESCRIPTION = "Event counts for impact time 25 dB."  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "CNT\_26"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 93  
BYTES = 4

FORMAT = "I4"  
UNIT = "N/A"  
MISSING\_CONSTANT = 9999  
DESCRIPTION = "Event counts for impact time 26 dB."  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "CNT\_27"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 98  
BYTES = 4  
FORMAT = "I4"  
UNIT = "N/A"  
MISSING\_CONSTANT = 9999  
DESCRIPTION = "Event counts for impact time 27 dB."  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "CNT\_28"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 103  
BYTES = 4  
FORMAT = "I4"  
UNIT = "N/A"  
MISSING\_CONSTANT = 9999  
DESCRIPTION = "Event counts for impact time 28 dB."  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "CNT\_29"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 108  
BYTES = 4  
FORMAT = "I4"  
UNIT = "N/A"  
MISSING\_CONSTANT = 9999  
DESCRIPTION = "Event counts for impact time 29 dB."  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "CNT\_30"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 113  
BYTES = 4  
FORMAT = "I4"  
UNIT = "N/A"  
MISSING\_CONSTANT = 9999  
DESCRIPTION = "Event counts for impact time 30 dB."  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "CNT\_31"  
DATA\_TYPE = ASCII\_INTEGER

START\_BYTE = 118  
BYTES = 4  
FORMAT = "I4"  
UNIT = "N/A"  
MISSING\_CONSTANT = 9999  
DESCRIPTION = "Event counts for impact time 31 dB."  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "CNT\_32"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 123  
BYTES = 4  
FORMAT = "I4"  
UNIT = "N/A"  
MISSING\_CONSTANT = 9999  
DESCRIPTION = "Event counts for impact time 32 dB."  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "CNT\_33"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 128  
BYTES = 4  
FORMAT = "I4"  
UNIT = "N/A"  
MISSING\_CONSTANT = 9999  
DESCRIPTION = "Event counts for impact time 33 dB."  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "CNT\_34"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 133  
BYTES = 4  
FORMAT = "I4"  
UNIT = "N/A"  
MISSING\_CONSTANT = 9999  
DESCRIPTION = "Event counts for impact time 34 dB."  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "CNT\_35"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 138  
BYTES = 4  
FORMAT = "I4"  
UNIT = "N/A"  
MISSING\_CONSTANT = 9999  
DESCRIPTION = "Event counts for impact time 35 dB."  
END\_OBJECT = COLUMN

OBJECT = COLUMN

NAME = "CNT\_36"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 143  
BYTES = 4  
FORMAT = "I4"  
UNIT = "N/A"  
MISSING\_CONSTANT = 9999  
DESCRIPTION = "Event counts for impact time 36 dB."  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "CNT\_37"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 148  
BYTES = 4  
FORMAT = "I4"  
UNIT = "N/A"  
MISSING\_CONSTANT = 9999  
DESCRIPTION = "Event counts for impact time 37 dB."  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "CNT\_38"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 153  
BYTES = 4  
FORMAT = "I4"  
UNIT = "N/A"  
MISSING\_CONSTANT = 9999  
DESCRIPTION = "Event counts for impact time 38 dB."  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "CNT\_39"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 158  
BYTES = 4  
FORMAT = "I4"  
UNIT = "N/A"  
MISSING\_CONSTANT = 9999  
DESCRIPTION = "Event counts for impact time 39 dB."  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "CNT\_40"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 163  
BYTES = 4  
FORMAT = "I4"  
UNIT = "N/A"  
MISSING\_CONSTANT = 9999  
DESCRIPTION = "Event counts for impact time 40 dB."  
END\_OBJECT = COLUMN



```
OBJECT = COLUMN
  NAME = "CNT_41"
  DATA_TYPE = ASCII_INTEGER
  START_BYTE = 168
  BYTES = 4
  FORMAT = "I4"
  UNIT = "N/A"
  MISSING_CONSTANT = 9999
  DESCRIPTION = "Event counts for impact time 41 dB."
END_OBJECT = COLUMN
```

```
OBJECT = COLUMN
  NAME = "CNT_42"
  DATA_TYPE = ASCII_INTEGER
  START_BYTE = 173
  BYTES = 4
  FORMAT = "I4"
  UNIT = "N/A"
  MISSING_CONSTANT = 9999
  DESCRIPTION = "Event counts for impact time 42 dB."
END_OBJECT = COLUMN
```

```
OBJECT = COLUMN
  NAME = "CNT_43"
  DATA_TYPE = ASCII_INTEGER
  START_BYTE = 178
  BYTES = 4
  FORMAT = "I4"
  UNIT = "N/A"
  MISSING_CONSTANT = 9999
  DESCRIPTION = "Event counts for impact time 43 dB."
END_OBJECT = COLUMN
```

```
OBJECT = COLUMN
  NAME = "CNT_44"
  DATA_TYPE = ASCII_INTEGER
  START_BYTE = 183
  BYTES = 4
  FORMAT = "I4"
  UNIT = "N/A"
  MISSING_CONSTANT = 9999
  DESCRIPTION = "Event counts for impact time 44 dB."
END_OBJECT = COLUMN
```

```
OBJECT = COLUMN
  NAME = "CNT_45"
  DATA_TYPE = ASCII_INTEGER
  START_BYTE = 188
  BYTES = 4
  FORMAT = "I4"
  UNIT = "N/A"
  MISSING_CONSTANT = 9999
```

DESCRIPTION = "Event counts for impact time 45 dB."  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "CNT\_46"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 193  
BYTES = 4  
FORMAT = "I4"  
UNIT = "N/A"  
MISSING\_CONSTANT = 9999  
DESCRIPTION = "Event counts for impact time 46 dB."  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "CNT\_47"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 198  
BYTES = 4  
FORMAT = "I4"  
UNIT = "N/A"  
MISSING\_CONSTANT = 9999  
DESCRIPTION = "Event counts for impact time 47 dB."  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "CNT\_48"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 203  
BYTES = 4  
FORMAT = "I4"  
UNIT = "N/A"  
MISSING\_CONSTANT = 9999  
DESCRIPTION = "Event counts for impact time 48 dB."  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "CNT\_49"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 208  
BYTES = 4  
FORMAT = "I4"  
UNIT = "N/A"  
MISSING\_CONSTANT = 9999  
DESCRIPTION = "Event counts for impact time 49 dB."  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "CNT\_50"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 213  
BYTES = 4  
FORMAT = "I4"

UNIT = "N/A"  
MISSING\_CONSTANT = 9999  
DESCRIPTION = "Event counts for impact time 50 dB."  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "CNT\_51"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 218  
BYTES = 4  
FORMAT = "I4"  
UNIT = "N/A"  
MISSING\_CONSTANT = 9999  
DESCRIPTION = "Event counts for impact time 51 dB."  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "CNT\_52"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 223  
BYTES = 4  
FORMAT = "I4"  
UNIT = "N/A"  
MISSING\_CONSTANT = 9999  
DESCRIPTION = "Event counts for impact time 52 dB."  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "CNT\_53"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 228  
BYTES = 4  
FORMAT = "I4"  
UNIT = "N/A"  
MISSING\_CONSTANT = 9999  
DESCRIPTION = "Event counts for impact time 53 dB."  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "CNT\_54"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 233  
BYTES = 4  
FORMAT = "I4"  
UNIT = "N/A"  
MISSING\_CONSTANT = 9999  
DESCRIPTION = "Event counts for impact time 54 dB."  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "CNT\_55"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 238

BYTES = 4  
FORMAT = "I4"  
UNIT = "N/A"  
MISSING\_CONSTANT = 9999  
DESCRIPTION = "Event counts for impact time 55 dB."  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "CNT\_56"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 243  
BYTES = 4  
FORMAT = "I4"  
UNIT = "N/A"  
MISSING\_CONSTANT = 9999  
DESCRIPTION = "Event counts for impact time 56 dB."  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "CNT\_57"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 248  
BYTES = 4  
FORMAT = "I4"  
UNIT = "N/A"  
MISSING\_CONSTANT = 9999  
DESCRIPTION = "Event counts for impact time 57 dB."  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "CNT\_58"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 253  
BYTES = 4  
FORMAT = "I4"  
UNIT = "N/A"  
MISSING\_CONSTANT = 9999  
DESCRIPTION = "Event counts for impact time 58 dB."  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "CNT\_59"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 258  
BYTES = 4  
FORMAT = "I4"  
UNIT = "N/A"  
MISSING\_CONSTANT = 9999  
DESCRIPTION = "Event counts for impact time 59 dB."  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "CNT\_60"

DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 263  
BYTES = 4  
FORMAT = "I4"  
UNIT = "N/A"  
MISSING\_CONSTANT = 9999  
DESCRIPTION = "Event counts for impact time 60 dB."  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "CNT\_61"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 268  
BYTES = 4  
FORMAT = "I4"  
UNIT = "N/A"  
MISSING\_CONSTANT = 9999  
DESCRIPTION = "Event counts for impact time 61 dB."  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "CNT\_62"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 273  
BYTES = 4  
FORMAT = "I4"  
UNIT = "N/A"  
MISSING\_CONSTANT = 9999  
DESCRIPTION = "Event counts for impact time 62 dB."  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "CNT\_63"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 278  
BYTES = 4  
FORMAT = "I4"  
UNIT = "N/A"  
MISSING\_CONSTANT = 9999  
DESCRIPTION = "Event counts for impact time 63 dB."  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "CNT\_64"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 283  
BYTES = 4  
FORMAT = "I4"  
UNIT = "N/A"  
MISSING\_CONSTANT = 9999  
DESCRIPTION = "Event counts for impact time 64 dB."  
END\_OBJECT = COLUMN

```
OBJECT = COLUMN
  NAME = "CNT_65"
  DATA_TYPE = ASCII_INTEGER
  START_BYTE = 288
  BYTES = 4
  FORMAT = "I4"
  UNIT = "N/A"
  MISSING_CONSTANT = 9999
  DESCRIPTION = "Event counts for impact time 65 dB."
END_OBJECT = COLUMN
```

```
OBJECT = COLUMN
  NAME = "CNT_66"
  DATA_TYPE = ASCII_INTEGER
  START_BYTE = 293
  BYTES = 4
  FORMAT = "I4"
  UNIT = "N/A"
  MISSING_CONSTANT = 9999
  DESCRIPTION = "Event counts for impact time 66 dB."
END_OBJECT = COLUMN
```

```
OBJECT = COLUMN
  NAME = "CNT_67"
  DATA_TYPE = ASCII_INTEGER
  START_BYTE = 298
  BYTES = 4
  FORMAT = "I4"
  UNIT = "N/A"
  MISSING_CONSTANT = 9999
  DESCRIPTION = "Event counts for impact time 67 dB."
END_OBJECT = COLUMN
```

```
OBJECT = COLUMN
  NAME = "CNT_68"
  DATA_TYPE = ASCII_INTEGER
  START_BYTE = 303
  BYTES = 4
  FORMAT = "I4"
  UNIT = "N/A"
  MISSING_CONSTANT = 9999
  DESCRIPTION = "Event counts for impact time 68 dB."
END_OBJECT = COLUMN
```

```
OBJECT = COLUMN
  NAME = "CNT_69"
  DATA_TYPE = ASCII_INTEGER
  START_BYTE = 308
  BYTES = 4
  FORMAT = "I4"
  UNIT = "N/A"
  MISSING_CONSTANT = 9999
  DESCRIPTION = "Event counts for impact time 69 dB."
```

```

END_OBJECT          = COLUMN

OBJECT              = COLUMN
  NAME              = "CNT_70"
  DATA_TYPE        = ASCII_INTEGER
  START_BYTE        = 313
  BYTES             = 4
  FORMAT            = "I4"
  UNIT              = "N/A"
  MISSING_CONSTANT = 9999
  DESCRIPTION       = "Event counts for impact time 70 dB."
END_OBJECT          = COLUMN
  
```

#### 4.3.2.4.2.1.5 DIM Burst Continuous test mode

Single events on one sensor face are registered. In DIM\_BCTEST mode measured values are not stored in a compressed way (as in DIM\_BC mode), but for each event the peak voltage (in mV and dB) and the impact time (timer count and time [dB]) are included in telemetry. No average samples are measured.

The parameter data (general parameters, average mode parameters and burst mode parameters) associated with the BC Test measurement are kept in a separate file (combined detached labels).

#### DIM BC Test Parameters table

The parameters table is the same for Burst Continuous Average mode and Burst mode.

The parameters are described in the following TABLE object.

```

OBJECT              = BCTEST_PARAM_TABLE
  NAME              = BCTEST_PARAM
  INTERCHANGE_FORMAT = ASCII
  ROWS              =
  COLUMNS          =
  ROW_BYTES         =
  ^STRUCTURE        = "DIM_BCT_PAR.FMT"
END_OBJECT          = BCTEST_PARAM_TABLE
  
```

The structure of the TABLE object is defined in the file DIM\_BCT\_PAR.FMT.

```

OBJECT              = COLUMN
  NAME              = "SESAME_SEQ_ID"
  DATA_TYPE        = ASCII_INTEGER
  START_BYTE        = 1
  BYTES             = 6
  UNIT              = "N/A"
  FORMAT            = "I6"
  DESCRIPTION       = "Sequence ID in the current data file"
END_OBJECT          = COLUMN

OBJECT              = COLUMN
  NAME              = "UTC"
  DATA_TYPE        = TIME
  START_BYTE        = 8
  BYTES             = 23
  DESCRIPTION       = "This column represents the UTC Time"
END_OBJECT          = COLUMN
  
```

OBJECT = COLUMN  
NAME = "SESAME\_LOCAL\_TIME"  
DATA\_TYPE = CHARACTER  
START\_BYTE = 33  
BYTES = 15  
FORMAT = "A15"  
UNIT = "N/A"  
DESCRIPTION = "Start time of measurement represented as :  
Reset number (integer starting at 1) / seconds  
The time resolution is 0.03125 s"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "DIRECTION"  
DATA\_TYPE = CHARACTER  
START\_BYTE = 51  
BYTES = 1  
UNIT = "N/A"  
FORMAT = "A1"  
DESCRIPTION = "Direction in DIM coordinate system,  
X, Y or Z.  
Echoed command parameter."  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "MARGIN"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 54  
BYTES = 2  
UNIT = "DECIBEL"  
FORMAT = "I2"  
DESCRIPTION = "The margin determines the detection  
threshold of the measuring amplifier.  
Echoed command parameter. "  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "DECAY\_TIME"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 57  
BYTES = 3  
UNIT = "MILLISECOND"  
FORMAT = "I3"  
DESCRIPTION = "Decay time.  
Range from 0 to 255.  
Echoed command parameter."  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "MEAS\_TIME"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 61



```
    BYTES                = 5
    UNIT                  = "SECOND"
    FORMAT                = "I5"
    DESCRIPTION           = "Measuring time.
                          Echoed command parameter."
END_OBJECT              = COLUMN

OBJECT                  = COLUMN
  NAME                   = "NEVENT"
  DATA_TYPE             = ASCII_INTEGER
  START_BYTE            = 67
  BYTES                  = 5
  UNIT                   = "N/A"
  FORMAT                 = "I5"
  DESCRIPTION            = "Number of events detected."
END_OBJECT              = COLUMN

OBJECT                  = COLUMN
  NAME                   = "N_FALSE_EVENTS"
  DATA_TYPE             = ASCII_INTEGER
  START_BYTE            = 73
  BYTES                  = 5
  UNIT                   = "N/A"
  FORMAT                 = "I5"
  DESCRIPTION            = "Number of false events."
END_OBJECT              = COLUMN

OBJECT                  = COLUMN
  NAME                   = "N_LONG_EVENTS"
  DATA_TYPE             = ASCII_INTEGER
  START_BYTE            = 79
  BYTES                  = 5
  UNIT                   = "N/A"
  FORMAT                 = "I5"
  DESCRIPTION            = "Number of long events."
END_OBJECT              = COLUMN

OBJECT                  = COLUMN
  NAME                   = "N_AV_SAMPLES"
  DATA_TYPE             = ASCII_INTEGER
  START_BYTE            = 85
  BYTES                  = 5
  UNIT                   = "N/A"
  FORMAT                 = "I5"
  DESCRIPTION            = "Number of average samples."
END_OBJECT              = COLUMN
```

## DIM BC Test data

The average mode data are described in the following TABLE object.

```
OBJECT                  = BCTEST_SIG_TABLE
  NAME                   = AVERAGE_MODE
  INTERCHANGE_FORMAT     = ASCII
```

```

ROWS                = 7
COLUMNS            = 8
ROW_BYTES           = 87
^STRUCTURE          = "DIM_BCT_SIG.FMT"
END_OBJECT          = BCTEST_SIG_TABLE
  
```

The structure of the TABLE object is defined in the file DIM\_BCT\_SIG.FMT.

```

OBJECT              = COLUMN
  NAME              = "SESAME_SEQ_ID"
  DATA_TYPE        = ASCII_INTEGER
  START_BYTE        = 1
  BYTES             = 6
  UNIT              = "N/A"
  FORMAT            = "I6"
  DESCRIPTION       = "Sequence ID in the current data file"
END_OBJECT          = COLUMN
  
```

```

OBJECT              = COLUMN
  NAME              = "UTC"
  DATA_TYPE        = TIME
  START_BYTE        = 8
  BYTES             = 23
  DESCRIPTION       = "Measurement time (UTC in PDS standard format
                      YYYY-MM-DDThh:mm:ss.sss) "
END_OBJECT          = COLUMN
  
```

```

OBJECT              = COLUMN
  NAME              = "S_LOCAL_TIME_START"
  DATA_TYPE        = CHARACTER
  START_BYTE        = 33
  BYTES             = 15
  FORMAT            = "A15"
  UNIT              = "N/A"
  DESCRIPTION       = "Start time of measurement represented as :
                      Reset number (integer starting at 1) / seconds
                      The time resolution is 0.03125 s"
END_OBJECT          = COLUMN
  
```

```

OBJECT              = COLUMN
  NAME              = "S_LOCAL_TIME_END"
  DATA_TYPE        = CHARACTER
  START_BYTE        = 51
  BYTES             = 15
  FORMAT            = "A15"
  UNIT              = "N/A"
  DESCRIPTION       = "SESAME local time (1/32 s) for end of measurement
                      Reset number (integer starting at 1) / seconds
                      The time resolution is 0.03125 s"
END_OBJECT          = COLUMN
  
```

```

OBJECT              = COLUMN
  NAME              = "TIMER_CNT"
  
```

```

DATA_TYPE      = ASCII_INTEGER
START_BYTE     = 68
BYTES         = 5
UNIT          = "N/A"
FORMAT        = "I5"
DESCRIPTION    = "Timer count at impact time.
                  The time resolution is 0.03125 s"
END_OBJECT    = COLUMN

OBJECT        = COLUMN
NAME         = "PEAK_AMPLITUDE"
DATA_TYPE    = ASCII_INTEGER
START_BYTE   = 74
BYTES       = 5
UNIT       = "MILLIVOLT"
FORMAT    = "I5"
DESCRIPTION = "Event peak amplitude"
END_OBJECT = COLUMN

OBJECT        = COLUMN
NAME         = "TIMER_CNT_CMPRS"
DATA_TYPE    = ASCII_INTEGER
START_BYTE   = 80
BYTES       = 2
UNIT       = "DECIBEL"
FORMAT    = "I2"
DESCRIPTION = "Event timer count at impact time,
                  in compressed format"
END_OBJECT    = COLUMN

OBJECT        = COLUMN
NAME         = "PEAK_AMPLITUDE_CMPRS"
DATA_TYPE    = ASCII_INTEGER
START_BYTE   = 83
BYTES       = 2
UNIT       = "DECIBEL"
FORMAT    = "I2"
DESCRIPTION = "Event peak amplitude in compressed format"
END_OBJECT    = COLUMN
  
```

#### 4.3.2.4.2.1.6 DIM Burst Continuous test mode 2

Additionally to the regular Burst Continuous Mode (which delivers the DIM (U, T<sub>c</sub>)-matrix), a Burst Continuous Test Mode (DIM\_BCTEST2) is implemented. DIM\_BCTEST2 delivers for each single impact U[mV], U[dB], TC, T<sub>c</sub>[dB] and – deviating from DIM\_BCTEST in earlier flight software versions – additionally the Lander On-board Time (LOBT), when the impact was registered (event time). The LOBT is determined directly after the event was accepted as a real impact.

As for the Burst Continuous Test mode the parameter data (general parameters, average mode parameters and burst mode parameters) are kept in a separate file (combined detached labels).

#### **DIM BC Test 2 parameters table**

The parameters table for BC Test 2 mode is the same as for the BC Test mode (see § 4.3.2.4.2.1.5)

## DIM BC Test 2 data

The BC Test 2 mode data are described in the following TABLE object.

```

OBJECT          = BCTEST2_SIG_TABLE
  NAME          = AVERAGE_MODE
  INTERCHANGE_FORMAT = ASCII
  ROWS          =
  COLUMNS      =
  ROW_BYTES     =
  ^STRUCTURE    = "DIM_BCTEST2_SIG_FM3.FMT"
END_OBJECT      = BCTEST2_SIG_TABLE
  
```

The structure of the TABLE object is defined in the file DIM\_BCTEST2\_SIG\_FM3.FMT.

```

OBJECT          = COLUMN
  NAME          = "SESAME_SEQ_ID"
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 1
  BYTES         = 6
  FORMAT        = "I6"
  UNIT          = "N/A"
  MISSING_CONSTANT = 999999
  DESCRIPTION   = "Sequence ID in the current data file"
END_OBJECT      = COLUMN
  
```

```

OBJECT          = COLUMN
  NAME          = "EVENT_TIME"
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 8
  BYTES         = 15
  FORMAT        = "I15"
  DESCRIPTION   = "Event time. SESAME local time
                  (SLT) runs with a resolution of 1/32 seconds.
                  SLT represents the least significant 32 bits
                  of LOBT. The most significant 5 bits are in
                  CDMS RSST (see SESAME Ready Message)"
END_OBJECT      = COLUMN
  
```

```

OBJECT          = COLUMN
  NAME          = "COUNTS"
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 24
  BYTES         = 6
  FORMAT        = "I6"
  UNIT          = "N/A"
  MISSING_CONSTANT = 999999
  DESCRIPTION   = "DIM calibration timer counts"
END_OBJECT      = COLUMN
  
```

```

OBJECT          = COLUMN
  NAME          = "PEAK_MV"
  DATA_TYPE    = ASCII_INTEGER
  
```

```

START_BYTE           = 31
BYTES                = 4
UNIT                 = "MILLIVOLT"
FORMAT               = "I4"
MISSING_CONSTANT     = 9999
DESCRIPTION           = "Peak voltage in mV"
END_OBJECT           = COLUMN

OBJECT                = COLUMN
NAME                  = "TIME_DB"
DATA_TYPE             = ASCII_INTEGER
START_BYTE           = 36
BYTES                 = 2
UNIT                  = "DECIBEL"
FORMAT               = "I2"
MISSING_CONSTANT     = 99
DESCRIPTION           = "Timer counts in compressed format"
END_OBJECT           = COLUMN

OBJECT                = COLUMN
NAME                  = "PEAK_DB"
DATA_TYPE             = ASCII_INTEGER
START_BYTE           = 39
BYTES                 = 2
UNIT                  = "DECIBEL"
FORMAT               = "I2"
MISSING_CONSTANT     = 99
DESCRIPTION           = "Peak voltage in dB"
END_OBJECT           = COLUMN
  
```

#### 4.3.2.4.3 PP object definitions

The structures of PP measurements differ according to flight software versions. The details concerning the telemetry formats can be found in [AD1] for flight software version 1 (FM1), in [AD2] for flight software version 2 (FM2) and in [AD3] for flight software version 3 (FM-3). The FM2 software was uploaded on 2007-09-24 at 19h40 UTC (during Payload Checkout #6). The FM3 software was uploaded on 2009-09-24 at 02h00 UTC (during PC#10).

##### 4.3.2.4.3.1 Flight software version FM1

###### 4.3.2.4.3.1.1 PP Active Mode Test

During an active mode test, one active PP measurement is performed. Adjusted and measured values (DAC table read back from PP memory, time series of transmitter current and receiver voltage samples) are sent to ground. Telemetry concludes with the results of the on-board data evaluation. Adjustable parameters of command active mode test are the configuration of electrodes, the transmitting frequency and the number of sine waves.

The PP AMTEST data are organized as tables containing parameters, the DAC table read back from PP memory, transmitter and receiver time series. The tables are kept in separate data files (combined detached labels). Consequently there will be one PDS label pointing to four data files.

Following is an example of PDS files corresponding to an AMTEST measurement.

```

SES_FS2_PAM_070929214512_TEST.LBL (label)
SES_FS2_PAM_070929214512_TPAR.TAB (parameters)
SES_FS2_PAM_070929214512_TDAC.TAB (DAC table)
SES_FS2_PAM_070929214512_TTX.TAB (transmitter time series)
SES_FS2_PAM_070929214512_TRX.TAB (receiver time series)
  
```

The parameters are described by the following TABLE object.

```

OBJECT          = AMT_PAR_TABLE
  NAME          = "AMT_PAR"
  INTERCHANGE_FORMAT = ASCII
  ROWS          = 2
  COLUMNS     = 8
  ROW_BYTES    = 82
  ^STRUCTURE   = "PP_AMT_PAR.FMT"
END_OBJECT     = AMT_PAR_TABLE
  
```

The structure of the parameters table is described in the file PP\_AMT\_PAR.FMT.

```
/* PP AMTEST sensor settings, version 2, 2015-11-11 */
```

```

OBJECT          = COLUMN
  NAME          = "SESAME_SEQ_ID"
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 1
  BYTES        = 6
  UNIT         = "N/A"
  FORMAT       = "I6"
  DESCRIPTION   = "Sequence ID in the current data file"
END_OBJECT     = COLUMN
  
```

```

OBJECT          = COLUMN
  NAME          = "UTC"
  DATA_TYPE    = TIME
  START_BYTE    = 8
  BYTES        = 23
  DESCRIPTION   = "Measurement start time (UTC in PDS standard
                  format YYYY-MM-DDThh:mm:ss.sss)"
END_OBJECT     = COLUMN
  
```

```

OBJECT          = COLUMN
  NAME          = "SESAME_LOCAL_TIME"
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 32
  BYTES        = 15
  FORMAT       = "I15"
  DESCRIPTION   = "Measurement start time. SESAME local time
                  (SLT) runs with a resolution of 1/32 seconds.
                  SLT represents the least significant 32 bits
                  of LOBT. The most significant 5 bits are in
                  CDMS RSST (see SESAME Ready Message)"
END_OBJECT     = COLUMN
  
```

```

OBJECT          = COLUMN
  NAME          = "SENSOR_SETTINGS"
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 48
  BYTES        = 7
  
```

```
UNIT          = "N/A"
DESCRIPTION   = "Commanded (echoed) electrode combination
as 3-digit hexadecimal code 16#abi#
with the following meaning:
a: electrode connected to the TX A output.
Possible values:
0 [none],
1 [+X leg],
2 [MUPUS PEN]
b: electrode connected to the TX B output.
Possible values:
0 [none],
2 [MUPUS PEN],
3 [APXS]
i: input channel
Possible values:
0 [potential difference]
1 [current at +X leg]
2 [current at MUPUS PEN]
3 [current at APXS]
4 [direct measurement at +Y foot]
5 [direct measurement at -Y foot]
6 [reference voltage -2.5 V]
7 [reference voltage +2.5 V] "
```

```
END_OBJECT    = COLUMN

OBJECT        = COLUMN
NAME          = "TX_FREQ"
DATA_TYPE     = ASCII_INTEGER
START_BYTE    = 56
BYTES        = 5
UNIT         = "HERTZ"
FORMAT       = "I5"
DESCRIPTION   = "Tx frequency "
END_OBJECT    = COLUMN

OBJECT        = COLUMN
NAME          = "TX/RX_WAVES"
DATA_TYPE     = ASCII_INTEGER
START_BYTE    = 62
BYTES        = 3
UNIT         = "N/A"
FORMAT       = I3
DESCRIPTION   = "Number of Tx/Rx waves "
END_OBJECT    = COLUMN

OBJECT        = COLUMN
NAME          = "NUMBER_OF_SAMPLES"
DATA_TYPE     = ASCII_INTEGER
START_BYTE    = 66
BYTES        = 5
UNIT         = "N/A"
FORMAT       = "I5"
```

```
DESCRIPTION = "Number of transmitter current and receiver voltage
samples "
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "ERROR_CODE"
DATA_TYPE = ASCII_INTEGER
START_BYTE = 72
BYTES = 8
MISSING_CONSTANT = 16#0000#
DESCRIPTION = "Active mode results as Hex value 16#xxxx#
The possible values are:
8001 Invalid register address.
8002 Error verifying register write.
8004 Error accessing power register.
8008 MUX setting not allowed.
8010 Error accessing PP RAM.
8020 Tried to start measurement but a measurement
is already running.
0040 Error during writing to instrument.
0080 Error during reading from instrument.
0100 Error using ADC of C-DPU.
0200 Error during DAC table generation.
0400 Calculated number of samples > N_SAMP_MAX.
8800 C-DPU memory exhausted.
9000 Measurement time out.
2000 Invalid command parameter.
8000 Flag indicates fatal error. "
END_OBJECT = COLUMN
```

The DAC table is described by the following TABLE object.

```
OBJECT = AMTESTDAC_TABLE
NAME = AMTESTDAC
INTERCHANGE_FORMAT = ASCII
ROWS = 256
COLUMNS = 5
ROW_BYTES = 57
^STRUCTURE = "PP_AMT_DAC.FMT"
END_OBJECT = AMTESTDAC_TABLE
```

The structure of the DAC table is described in the file PP\_AMT\_DAC.FMT.

```
OBJECT = COLUMN
NAME = "SESAME_SEQ_ID"
DATA_TYPE = ASCII_INTEGER
START_BYTE = 1
BYTES = 6
UNIT = "N/A"
FORMAT = "I6"
DESCRIPTION = "Sequence ID in the current data file"
```



```
END_OBJECT          = COLUMN

OBJECT              = COLUMN
  NAME              = "UTC"
  DATA_TYPE        = TIME
  START_BYTE        = 8
  BYTES             = 23
  DESCRIPTION       = "Measurement start time (UTC in PDS standard
                      format YYYY-MM-DDThh:mm:ss.sss)"
END_OBJECT          = COLUMN

OBJECT              = COLUMN
  NAME              = "SESAME_LOCAL_TIME"
  DATA_TYPE        = ASCII_INTEGER
  START_BYTE        = 32
  BYTES             = 15
  FORMAT            = "I15"
  DESCRIPTION       = "Measurement start time. SESAME local time
                      (SLT) runs with a resolution of 1/32 seconds.
                      SLT represents the least significant 32 bits
                      of LOBT. The most significant 5 bits are in
                      CDMS RSST (see SESAME Ready Message)"
END_OBJECT          = COLUMN

OBJECT              = COLUMN
  NAME              = "DAC_SAMPLE "
  DATA_TYPE        = ASCII_INTEGER
  START_BYTE        = 48
  BYTES             = 3
  UNIT              = "N/A"
  FORMAT            = "I3"
  DESCRIPTION       = "DAC sample number"
END_OBJECT          = COLUMN

OBJECT              = COLUMN
  NAME              = "DAC_ADC_VALUE"
  DATA_TYPE        = ASCII_INTEGER
  START_BYTE        = 52
  BYTES             = 3
  UNIT              = "N/A"
  FORMAT            = "I3"
  DESCRIPTION       = "DAC ADC value "
END_OBJECT          = COLUMN
```

The receiver time series is described by the following TABLE object.

```
OBJECT              = AMTESTRX_TABLE
  NAME              = AMTESTRX
  INTERCHANGE_FORMAT = ASCII
  ROWS              = 8192
  COLUMNS          = 5
  ROW_BYTES         = 59
```

```

^STRUCTURE          = "PP_AMT_RX.FMT"
END_OBJECT          = AMT_RX_TABLE
  
```

The structure of the receiver time series table is described in the file PP\_AMT\_RX.FMT.

```
/* PP AMTEST / AMTEST2 Rx table entry version 2, 2015-11-11*/
```

```

OBJECT              = COLUMN
  NAME              = "SESAME_SEQ_ID"
  DATA_TYPE        = ASCII_INTEGER
  START_BYTE        = 1
  BYTES             = 6
  UNIT              = "N/A"
  FORMAT            = "I6"
  DESCRIPTION        = "Sequence ID in the current data file"
END_OBJECT          = COLUMN
  
```

```

OBJECT              = COLUMN
  NAME              = "UTC"
  DATA_TYPE        = TIME
  START_BYTE        = 8
  BYTES             = 23
  DESCRIPTION        = "Measurement start time (UTC in PDS standard
                        format YYYY-MM-DDThh:mm:ss.sss)"
END_OBJECT          = COLUMN
  
```

```

OBJECT              = COLUMN
  NAME              = "SESAME_LOCAL_TIME"
  DATA_TYPE        = ASCII_INTEGER
  START_BYTE        = 32
  BYTES             = 15
  FORMAT            = "I15"
  DESCRIPTION        = "Measurement start time. SESAME local time
                        (SLT) runs with a resolution of 1/32 seconds.
                        SLT represents the least significant 32 bits
                        of LOBT. The most significant 5 bits are in
                        CDMS RSST (see SESAME Ready Message)"
END_OBJECT          = COLUMN
  
```

```

OBJECT              = COLUMN
  NAME              = "RX_SAMPLE "
  DATA_TYPE        = ASCII_INTEGER
  START_BYTE        = 48
  BYTES             = 5
  UNIT              = "N/A"
  FORMAT            = "I5"
  DESCRIPTION        = "Rx sample number"
END_OBJECT          = COLUMN
  
```

```

OBJECT              = COLUMN
  NAME              = "RX_ADC_VALUE"
  DATA_TYPE        = ASCII_INTEGER
  START_BYTE        = 54
  
```

```
BYTES          = 3
UNIT           = "N/A"
FORMAT        = "I3"
DESCRIPTION    = "RX ADC value "
END_OBJECT    = COLUMN
```

The transmitter time series is described by the following TABLE object.

```
OBJECT          = AMTESTTX_TABLE
NAME           = AMTESTTX
INTERCHANGE_FORMAT = ASCII
ROWS           = 8192
COLUMNS       = 5
ROW_BYTES      = 59
^STRUCTURE     = "PP_AMT_TX.FMT"
END_OBJECT     = AMTESTTX_TABLE
```

The structure of the transmitter TABLE object is defined in the file PP\_AMT\_TX.FMT.

```
OBJECT          = COLUMN
NAME           = "SESAME_SEQ_ID"
DATA_TYPE      = ASCII_INTEGER
START_BYTE     = 1
BYTES          = 6
UNIT           = "N/A"
FORMAT        = "I6"
DESCRIPTION    = "Sequence ID in the current data file"
END_OBJECT     = COLUMN
```

```
OBJECT          = COLUMN
NAME           = "UTC"
DATA_TYPE      = TIME
START_BYTE     = 8
BYTES          = 23
DESCRIPTION    = "Measurement start time (UTC in PDS standard
                  format YYYY-MM-DDThh:mm:ss.sss)"
END_OBJECT     = COLUMN
```

```
OBJECT          = COLUMN
NAME           = "SESAME_LOCAL_TIME"
DATA_TYPE      = ASCII_INTEGER
START_BYTE     = 32
BYTES          = 15
FORMAT        = "I15"
DESCRIPTION    = "Measurement start time. SESAME local time
                  (SLT) runs with a resolution of 1/32 seconds.
                  SLT represents the least significant 32 bits
                  of LOBT. The most significant 5 bits are in
                  CDMS RSST (see SESAME Ready Message)"
END_OBJECT     = COLUMN
```

```
OBJECT          = COLUMN
NAME           = "TX_SAMPLE "
```

```

DATA_TYPE      = ASCII_INTEGER
START_BYTE     = 48
BYTES          = 5
UNIT           = "N/A"
FORMAT         = "I5"
DESCRIPTION    = "Tx sample number"
END_OBJECT     = COLUMN
  
```

```

OBJECT         = COLUMN
NAME          = "TX_ADC_VALUE"
DATA_TYPE     = ASCII_INTEGER
START_BYTE    = 54
BYTES        = 3
UNIT         = "N/A"
FORMAT      = "I3"
DESCRIPTION  = "Tx ADC value "
END_OBJECT   = COLUMN
  
```

#### 4.3.2.4.3.1.2 PP Health Check (HC) data

Following is an example of PDS files corresponding to an HC measurement.

**SES\_FS2\_PHC\_070929214512\_HC.LBL** (label)

SES\_FS2\_PAM\_070929214512\_HC.TAB (parameters)

The HC data are described in the following TABLE object (simple detached label).

```

OBJECT          = SES_PHC_TABLE
NAME            = "SES_PHC"
INTERCHANGE_FORMAT = ASCII
ROWS           = 1
COLUMNS       = 14
ROW_BYTES      = 100
^STRUCTURE     = "PP_HC.FMT"
END_OBJECT     = SES_PHC_TABLE
  
```

The structure of the TABLE object is defined in the file PP\_HC.FMT.

/\* PP Health Check, version 2, 2015-11-11 \*/

```

OBJECT         = COLUMN
NAME          = "SESAME_SEQ_ID"
DATA_TYPE     = ASCII_INTEGER
START_BYTE    = 1
BYTES        = 6
UNIT         = "N/A"
FORMAT      = "I6"
DESCRIPTION  = "Sequence ID in the current data file"
END_OBJECT   = COLUMN
  
```

```

OBJECT         = COLUMN
NAME          = "UTC"
DATA_TYPE     = TIME
  
```

```

START_BYTE      = 8
BYTES           = 23
DESCRIPTION     = "Measurement start time (UTC in PDS standard
                  format YYYY-MM-DDThh:mm:ss.sss)"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
  NAME          = "SESAME_LOCAL_TIME"
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 32
  BYTES         = 15
  FORMAT        = "I15"
  DESCRIPTION   = "Measurement start time. SESAME local time
                  (SLT) runs with a resolution of 1/32 seconds.
                  SLT represents the least significant 32 bits
                  of LOBT. The most significant 5 bits are in
                  CDMS RSST (see SESAME Ready Message)"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
  NAME          = "LP_VALUE"
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 48
  BYTES         = 5
  UNIT          = "N/A"
  FORMAT        = "I5"
  DESCRIPTION   = "Result count of Langmuir probe measurement "
END_OBJECT      = COLUMN

OBJECT          = COLUMN
  NAME          = "ADC_OFFSET"
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 54
  BYTES         = 3
  UNIT          = "N/A"
  FORMAT        = "I3"
  DESCRIPTION   = "Should be close to 128
                  (128 represents zero with bipolar ADC)"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
  NAME          = "-2.5V REF"
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 58
  BYTES         = 3
  UNIT          = "N/A"
  FORMAT        = "I3"
  DESCRIPTION   = "-2.5V REF and +2.5V REF should be nearly
                  symmetrical to ADC offset"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
  NAME          = "+2.5V_REF"

```

```

DATA_TYPE           = ASCII_INTEGER
START_BYTE          = 62
BYTES               = 3
UNIT                = "N/A"
FORMAT              = "I3"
DESCRIPTION         = "-2.5V REF and +2.5V REF should be nearly
                      symmetrical to ADC offset"
END_OBJECT          = COLUMN

OBJECT              = COLUMN
NAME                = "DELTA"
DATA_TYPE           = ASCII_INTEGER
START_BYTE          = 66
BYTES               = 3
UNIT                = "N/A"
FORMAT              = "I3"
DESCRIPTION         = "Differential value RX2 - RX1"
END_OBJECT          = COLUMN

OBJECT              = COLUMN
NAME                = "LEG+Y_RX1"
DATA_TYPE           = ASCII_INTEGER
START_BYTE          = 70
BYTES               = 3
UNIT                = "N/A"
FORMAT              = "I3"
DESCRIPTION         = "Direct voltage from receiver 1 at +Y leg"
END_OBJECT          = COLUMN

OBJECT              = COLUMN
NAME                = "LEG-Y_RX2"
DATA_TYPE           = ASCII_INTEGER
START_BYTE          = 74
BYTES               = 3
UNIT                = "N/A"
FORMAT              = "I3"
DESCRIPTION         = "Direct voltage from receiver 2 at -Y leg"
END_OBJECT          = COLUMN

OBJECT              = COLUMN
NAME                = "LEG+X_TX1"
DATA_TYPE           = ASCII_INTEGER
START_BYTE          = 78
BYTES               = 3
UNIT                = "N/A"
FORMAT              = "I3"
DESCRIPTION         = "Transmitter current at electrode 1.
                      No voltage applied.
                      Should be close to ADC offset."
END_OBJECT          = COLUMN

OBJECT              = COLUMN
NAME                = "MUPUS_PEN_TX2"

```

```

DATA_TYPE      = ASCII_INTEGER
START_BYTE     = 82
BYTES         = 3
UNIT          = "N/A"
FORMAT        = "I3"
DESCRIPTION    = "Transmitter current at electrode 2.
                  No voltage applied.
                  Should be close to ADC offset."
END_OBJECT     = COLUMN

OBJECT         = COLUMN
NAME          = "APXS_TX3"
DATA_TYPE     = ASCII_INTEGER
START_BYTE    = 86
BYTES        = 3
UNIT         = "N/A"
FORMAT       = "I3"
DESCRIPTION  = "Transmitter current at electrode 3.
                  No volatge applied.
                  Should be close to ADC offset."
END_OBJECT   = COLUMN

OBJECT         = COLUMN
NAME          = "ERROR_CODE"
DATA_TYPE     = ASCII_INTEGER
START_BYTE    = 90
BYTES        = 8
UNIT         = "N/A"
MISSING_CONSTANT = 16#0000#
DESCRIPTION   = "Hex value as 16#xxxx#. The possible values are:
                  8001 Invalid register address.
                  8002 Error verifying register write.
                  8004 Error accessing power register.
                  8008 MUX setting not allowed.
                  8010 Error accessing PP RAM.
                  8020 Tried to start measurement but a measurement
                        is already running.
                  0040 Error during writing to instrument.
                  0080 Error during reading from instrument.
                  0100 Error using ADC of C-DPU.
                  0200 Error during DAC table generation.
                  0400 Calculated number of samples > N_SAMP_MAX.
                  8800 C-DPU memory exhausted.
                  9000 Measurement time out.
                  2000 Invalid command parameter.
                  8000 Flag indicates fatal error. "
END_OBJECT     = COLUMN
  
```

#### 4.3.2.4.3.1.3 PP Langmuir Probe Test (LM) data

This measurement sequence is mainly used for ground tests and is not a regular flight measurement. Following is an example of PDS files corresponding to an LM measurement.

**SES\_FS2\_PLM\_070929214512\_LM.LBL** (label)

SES\_FS2\_PLM\_070929214512\_LM.TAB (parameters)

The LM data are described in the following TABLE object (simple detached label).

```

OBJECT          = SES_PLM_TABLE
NAME            = "SES_LM"
INTERCHANGE_FORMAT = ASCII
ROWS           = 17
COLUMNS       = 6
ROW_BYTES      = 61
^STRUCTURE     = "PP_LM.FMT"
END_OBJECT     = SES_PLM_TABLE
  
```

The structure of the TABLE object is defined in the file PP\_LM.FMT.

/\* PP Langmuir Probe measurement, version 2, 2015-11-11 \*/

```

OBJECT          = COLUMN
NAME            = "SESAME_SEQ_ID"
DATA_TYPE       = ASCII_INTEGER
START_BYTE      = 1
BYTES           = 6
UNIT            = "N/A"
FORMAT          = "I6"
DESCRIPTION     = "Sequence ID in the current data file"
END_OBJECT     = COLUMN
  
```

```

OBJECT          = COLUMN
NAME            = "UTC"
DATA_TYPE       = TIME
START_BYTE      = 8
BYTES           = 23
DESCRIPTION     = "Measurement start time (UTC in PDS standard
                  format YYYY-MM-DDThh:mm:ss.sss)"
END_OBJECT     = COLUMN
  
```

```

OBJECT          = COLUMN
NAME            = "SESAME_LOCAL_TIME"
DATA_TYPE       = ASCII_INTEGER
START_BYTE      = 32
BYTES           = 15
FORMAT          = "I15"
DESCRIPTION     = "Measurement start time. SESAME local time
                  (SLT) runs with a resolution of 1/32 seconds.
                  SLT represents the least significant 32 bits
                  of LOBT. The most significant 5 bits are in
                  CDMS RSST (see SESAME Ready Message)"
END_OBJECT     = COLUMN
  
```

```

OBJECT          = COLUMN
NAME            = "NOM_CLK_DIV"
DATA_TYPE       = ASCII_INTEGER
START_BYTE      = 48
  
```



```

    BYTES           = 2
    UNIT            = "N/A"
    FORMAT          = "I2"
    DESCRIPTION     = "Nominal clock divider"
END_OBJECT        = COLUMN

OBJECT            = COLUMN
  NAME             = "ACT_CLK_DIV"
  DATA_TYPE       = ASCII_INTEGER
  START_BYTE       = 51
  BYTES            = 2
  UNIT             = "N/A"
  FORMAT           = "I2"
  DESCRIPTION      = "Actual clock divider"
END_OBJECT        = COLUMN

OBJECT            = COLUMN
  NAME             = "LP_VALUE"
  DATA_TYPE       = ASCII_INTEGER
  START_BYTE       = 54
  BYTES            = 5
  UNIT             = "N/A"
  FORMAT           = "I5"
  DESCRIPTION      = "Result count of Langmuir probe measurement "
END_OBJECT        = COLUMN
  
```

#### 4.3.2.4.3.1.4 PP Passive Mode Test (PMTEST)

The PMTEST was not used during flight.

#### 4.3.2.4.3.2 Flight software version FM2

##### 4.3.2.4.3.2.1 PP Active Mode Test

During an active mode test, one active PP measurement is performed. Adjusted and measured values (DAC table read back from PP memory, time series of transmitter current and receiver voltage samples) are sent to ground. Telemetry concludes with the results of the on-board data evaluation. Adjustable parameters of command active mode test are the configuration of electrodes, the transmitting frequency and amplitude and the number of sine waves. Because telemetry contains the raw time series data and the results of the on-board evaluation it is possible to check both, details of the time series and the correct working of the data evaluation.

The PP AMTEST2 data are organized as tables containing parameters including the on-board evaluation results, the DAC table read back from PP memory, transmitter and receiver time series. The tables are kept in separate data files (combined detached labels). Consequently there will be one PDS label pointing to four data files.

Following is an example of PDS files corresponding to an AMTEST2 measurement.

- SES\_FS2\_PAM\_070929214512\_TEST.LBL** (label)
- SES\_FS2\_PAM\_070929214512\_TPAR.TAB (parameters)
- SES\_FS2\_PAM\_070929214512\_TDAC.TAB (DAC table)
- SES\_FS2\_PAM\_070929214512\_TTX.TAB (transmitter time series)
- SES\_FS2\_PAM\_070929214512\_TRX.TAB (receiver time series)

The parameters are described by the following TABLE object.

```
OBJECT            = AMT_PAR_TABLE
```

```
NAME = "AMT_PAR"  
INTERCHANGE_FORMAT = ASCII  
ROWS = 2  
COLUMNS = 14  
ROW_BYTES = 137  
^STRUCTURE = "PP_AMT2_PAR.FMT"  
END_OBJECT = AMT_PAR_TABLE
```

The structure of the parameters table is described in the file PP\_AMT2\_PAR.FMT.

```
OBJECT = COLUMN  
NAME = "SESAME_SEQ_ID"  
DATA_TYPE = ASCII_INTEGER  
START_BYTE = 1  
BYTES = 6  
UNIT = "N/A"  
FORMAT = "I6"  
DESCRIPTION = "Sequence ID in the current data file"  
END_OBJECT = COLUMN
```

```
OBJECT = COLUMN  
NAME = "UTC"  
DATA_TYPE = TIME  
START_BYTE = 8  
BYTES = 23  
DESCRIPTION = "Measurement start time (UTC in PDS standard  
format YYYY-MM-DDThh:mm:ss.sss)"  
END_OBJECT = COLUMN
```

```
OBJECT = COLUMN  
NAME = "SESAME_LOCAL_TIME"  
DATA_TYPE = ASCII_INTEGER  
START_BYTE = 32  
BYTES = 15  
FORMAT = "I15"  
DESCRIPTION = "Measurement start time. SESAME local time  
(SLT) runs with a resolution of 1/32 seconds.  
SLT represents the least significant 32 bits  
of LOBT. The most significant 5 bits are in  
CDMS RSST (see SESAME Ready Message)"  
END_OBJECT = COLUMN
```

```
OBJECT = COLUMN  
NAME = "SENSOR_SETTINGS_CMD"  
DATA_TYPE = ASCII_INTEGER  
START_BYTE = 48  
BYTES = 7  
UNIT = "N/A"  
DESCRIPTION = "Commanded (echoed) electrode combination  
as 3-digit hexadecimal value 16#abi#  
with the following meaning:  
a: electrode connected to the TX A output.  
Possible values:
```

```
    0 [none],
    1 [+X leg],
    2 [MUPUS PEN]
b: electrode connected to the TX B output.
Possible values:
    0 [none],
    2 [MUPUS PEN],
    3 [APXS]
i: input channel
Possible values:
    0 [potential difference]
    1 [current at +X leg]
    2 [current at MUPUS PEN]
    3 [current at APXS]
    4 [direct measurement at +Y foot]
    5 [direct measurement at -Y foot]
    6 [reference voltage -2.5 V]
    7 [reference voltage +2.5 V] "
```

END\_OBJECT = COLUMN

```
OBJECT = COLUMN
NAME = "TX_FREQ"
DATA_TYPE = ASCII_INTEGER
START_BYTE = 56
BYTES = 5
UNIT = "HERTZ"
FORMAT = "I5"
DESCRIPTION = "Tx frequency "
END_OBJECT = COLUMN
```

```
OBJECT = COLUMN
NAME = "TX/RX WAVES"
DATA_TYPE = ASCII_INTEGER
START_BYTE = 62
BYTES = 3
UNIT = "N/A"
FORMAT = "I3"
DESCRIPTION = "Number of Tx/Rx waves "
END_OBJECT = COLUMN
```

```
OBJECT = COLUMN
NAME = "PTS_PER_WAVE"
DATA_TYPE = ASCII_INTEGER
START_BYTE = 66
BYTES = 3
UNIT = "N/A"
FORMAT = "I3"
DESCRIPTION = "Points per wave "
END_OBJECT = COLUMN
```

```
OBJECT = COLUMN
NAME = "TX_OUT_DAMPING"
DATA_TYPE = ASCII_INTEGER
```

```
START_BYTE      = 70
BYTES           = 1
UNIT            = "N/A"
FORMAT         = "I1"
DESCRIPTION     = "TX Voltage Amplitude Reduction. The possible values are:
    0 maximum amplitude.
    1 half amplitude.
    2 quarter amplitude.
    3 1/8 amplitude.
    4 1/16 amplitude."
END_OBJECT      = COLUMN

OBJECT          = COLUMN
NAME           = "ADC_DIV"
DATA_TYPE      = ASCII_INTEGER
START_BYTE     = 72
BYTES          = 4
UNIT           = "N/A"
FORMAT        = "I4"
DESCRIPTION    = "Sampling frequency is generated as 5 MHz / this parameter"
END_OBJECT     = COLUMN

OBJECT          = COLUMN
NAME           = "ADC_ADDR"
DATA_TYPE      = ASCII_INTEGER
START_BYTE     = 77
BYTES          = 5
UNIT           = "N/A"
FORMAT        = "I5"
MISSING_CONSTANT = 99999
DESCRIPTION    = "Adjusted last address in PP memory "
END_OBJECT     = COLUMN

OBJECT          = COLUMN
NAME           = "DAC_DIV"
DATA_TYPE      = ASCII_INTEGER
START_BYTE     = 83
BYTES          = 4
UNIT           = "N/A"
FORMAT        = "I4"
DESCRIPTION    = "Tx voltage update frequency is 5 MHz / this parameter"
END_OBJECT     = COLUMN

OBJECT          = COLUMN
NAME           = "DAC_ADDR"
DATA_TYPE      = ASCII_INTEGER
START_BYTE     = 88
BYTES          = 3
UNIT           = "N/A"
FORMAT        = "I3"
DESCRIPTION    = "Last used address in DAC table"
END_OBJECT     = COLUMN
```

OBJECT = COLUMN  
NAME = "ERROR\_CODE"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 92  
BYTES = 8  
MISSING\_CONSTANT = 16#0000#  
DESCRIPTION = "Active mode results as hexa 16#xxxx#  
The possible values are:  
8001 Invalid register address.  
8002 Error verifying register write.  
8004 Error accessing power register.  
8008 MUX setting not allowed.  
8010 Error accessing PP RAM.  
8020 Tried to start measurement but a measurement  
is already running.  
0040 Error during writing to instrument.  
0080 Error during reading from instrument.  
0100 Error using ADC of C-DPU.  
0200 Error during DAC table generation.  
0400 Calculated number of samples > N\_SAMP\_MAX.  
8800 C-DPU memory exhausted.  
9000 Measurement time out.  
2000 Invalid command parameter.  
8000 Flag indicates fatal error. "

END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "QUAL\_FLAG\_CL"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 101  
BYTES = 1  
FORMAT = "I1"  
UNIT = "N/A"  
DESCRIPTION = "PP quality flags. The possible values are:  
0 OK  
1 at least one sample equals 0 in  
current (transmitter) time series"

END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "QUAL\_FLAG\_VH"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 103  
BYTES = 1  
FORMAT = "I1"  
UNIT = "N/A"  
DESCRIPTION = "PP quality flags. The possible values are:  
0 OK  
1 at least one sample equals 255 in  
voltage (receiver) time series"

END\_OBJECT = COLUMN

OBJECT = COLUMN

```

NAME           = "QUAL_FLAG_VL"
DATA_TYPE      = ASCII_INTEGER
START_BYTE     = 105
BYTES          = 1
FORMAT         = "I1"
UNIT           = "N/A"
DESCRIPTION    = "PP quality flags. The possible values are:
    0 OK
    1 at least one sample equals 0 in
      voltage (receiver) time series"
END_OBJECT    = COLUMN

OBJECT         = COLUMN
NAME           = "POINTS_PER_WAVE"
DATA_TYPE      = ASCII_INTEGER
START_BYTE     = 107
BYTES          = 3
UNIT           = "N/A"
FORMAT         = "I3"
MISSING_CONSTANT = 999
DESCRIPTION    = "Number of points per wave used by receiver"
END_OBJECT    = COLUMN

OBJECT         = COLUMN
NAME           = "PHASE"
DATA_TYPE      = ASCII_REAL
START_BYTE     = 111
BYTES          = 8
UNIT           = "DEGREE"
FORMAT         = "F8.4"
DESCRIPTION    = "Phase difference potential-current"
END_OBJECT    = COLUMN

OBJECT         = COLUMN
NAME           = "CURRENT_AMPLITUDE"
DATA_TYPE      = ASCII_INTEGER
START_BYTE     = 120
BYTES          = 3
UNIT           = "N/A"
FORMAT         = "I3"
DESCRIPTION    = "Scaling as raw data without offset
    128 = max. ADC value for current"
END_OBJECT    = COLUMN

OBJECT         = COLUMN
NAME           = "VOLTAGE_AMPLITUDE"
DATA_TYPE      = ASCII_INTEGER
START_BYTE     = 124
BYTES          = 3
UNIT           = "N/A"
FORMAT         = "I3"
DESCRIPTION    = "Scaling as raw data without offset
    128 = max. ADC value for Rx voltage diff."
  
```

```
END_OBJECT          = COLUMN

OBJECT              = COLUMN
  NAME              = "MATH_ERR"
  DATA_TYPE        = CHARACTER
  START_BYTE        = 128
  BYTES             = 8
  MISSING_CONSTANT = 16#0000#
  DESCRIPTION       = "Hex value as 16#xxxx#"
    0001 Reduce: number of vector elements odd or less
    than 2; fatal.
    0002 Expand: less than four elements in input
    vector; fatal.
    0004 Too much data for analysis; truncating.
    0008 Too few data for analysis; padding with 128
    0010 Used number of waves is not a power of 2;
    truncated.
    0020 Not the expected number of elements in
    filtered arrays; fatal.
    0040 Argument for sine_table() not in valid range
    0<= deg2 <=720.
    0080 Overflow in divsin() or result inexact.
    0100 Too few data for trimmed mean calculation;
    regular mean used.
    0200 No data for warr.mean; particular: analysis
    yields no data.
    0400 Passive mode: not enough data in bin.
    0800 Not enough memory for data reduction."
END_OBJECT          = COLUMN
```

The DAC table is identical to the FM1 version and is described by the following TABLE object.

```
OBJECT              = AMTESTDAC_TABLE
  NAME              = AMTESTDAC
  INTERCHANGE_FORMAT = ASCII
  ROWS              = 256
  COLUMNS          = 5
  ROW_BYTES         = 57
  ^STRUCTURE        = "PP_AMT_DAC.FMT"
END_OBJECT          = AMTESTDAC_TABLE
```

The structure of the DAC table is described in the file PP\_AMT\_DAC.FMT.

```
/* PP AMTEST / AMTEST2 DAC table entry version 2, 2015-11-11 */
```

```
OBJECT              = COLUMN
  NAME              = "SESAME_SEQ_ID"
  DATA_TYPE        = ASCII_INTEGER
  START_BYTE        = 1
  BYTES             = 6
  UNIT              = "N/A"
  FORMAT            = "I6"
  DESCRIPTION       = "Sequence ID in the current data file"
```

```

END_OBJECT          = COLUMN

OBJECT              = COLUMN
  NAME              = "UTC"
  DATA_TYPE        = TIME
  START_BYTE        = 8
  BYTES             = 23
  DESCRIPTION       = "Measurement start time (UTC in PDS standard
                      format YYYY-MM-DDThh:mm:ss.sss)"

END_OBJECT          = COLUMN

OBJECT              = COLUMN
  NAME              = "SESAME_LOCAL_TIME"
  DATA_TYPE        = ASCII_INTEGER
  START_BYTE        = 32
  BYTES             = 15
  FORMAT            = "I15"
  DESCRIPTION       = "Measurement start time. SESAME local time
                      (SLT) runs with a resolution of 1/32 seconds.
                      SLT represents the least significant 32 bits
                      of LOBT. The most significant 5 bits are in
                      CDMS RSST (see SESAME Ready Message)"

END_OBJECT          = COLUMN

OBJECT              = COLUMN
  NAME              = "DAC_SAMPLE "
  DATA_TYPE        = ASCII_INTEGER
  START_BYTE        = 48
  BYTES             = 3
  UNIT              = "N/A"
  FORMAT            = "I3"
  DESCRIPTION       = "DAC sample number"

END_OBJECT          = COLUMN

OBJECT              = COLUMN
  NAME              = "DAC_ADC_VALUE"
  DATA_TYPE        = ASCII_INTEGER
  START_BYTE        = 52
  BYTES             = 3
  UNIT              = "N/A"
  FORMAT            = "I3"
  DESCRIPTION       = "DAC ADC value "

END_OBJECT          = COLUMN
  
```

The receiver time series is identical to the FM1 version and is described by the following TABLE object.

```

OBJECT              = AMTESTRX_TABLE
  NAME              = AMTESTRX
  INTERCHANGE_FORMAT = ASCII
  ROWS              = 8192
  
```



```

COLUMNS           = 5
ROW_BYTES          = 59
^STRUCTURE         = "PP_AMT_RX.FMT"
END_OBJECT         = AMT_RX_TABLE
  
```

The structure of the receiver time series table is described in the file PP\_AMT\_RX.FMT.

```
/* PP AMTEST / AMTEST2 Rx table entry version 2, 2015-11-11*/
```

```

OBJECT             = COLUMN
  NAME              = "SESAME_SEQ_ID"
  DATA_TYPE        = ASCII_INTEGER
  START_BYTE        = 1
  BYTES             = 6
  UNIT              = "N/A"
  FORMAT            = "I6"
  DESCRIPTION       = "Sequence ID in the current data file"
END_OBJECT         = COLUMN
  
```

```

OBJECT             = COLUMN
  NAME              = "UTC"
  DATA_TYPE        = TIME
  START_BYTE        = 8
  BYTES             = 23
  DESCRIPTION       = "Measurement start time (UTC in PDS standard
                        format YYYY-MM-DDThh:mm:ss.sss)"
END_OBJECT         = COLUMN
  
```

```

OBJECT             = COLUMN
  NAME              = "SESAME_LOCAL_TIME"
  DATA_TYPE        = ASCII_INTEGER
  START_BYTE        = 32
  BYTES             = 15
  FORMAT            = "I15"
  DESCRIPTION       = "Measurement start time. SESAME local time
                        (SLT) runs with a resolution of 1/32 seconds.
                        SLT represents the least significant 32 bits
                        of LOBT. The most significant 5 bits are in
                        CDMS RSST (see SESAME Ready Message)"
END_OBJECT         = COLUMN
  
```

```

OBJECT             = COLUMN
  NAME              = "RX_SAMPLE "
  DATA_TYPE        = ASCII_INTEGER
  START_BYTE        = 48
  BYTES             = 5
  UNIT              = "N/A"
  FORMAT            = "I5"
  DESCRIPTION       = "Rx sample number"
END_OBJECT         = COLUMN
  
```

```

OBJECT             = COLUMN
  NAME              = "RX_ADC_VALUE"
  
```



```
END_OBJECT          = COLUMN

OBJECT              = COLUMN
  NAME              = "TX_SAMPLE "
  DATA_TYPE        = ASCII_INTEGER
  START_BYTE        = 48
  BYTES             = 5
  UNIT              = "N/A"
  FORMAT            = "I5"
  DESCRIPTION       = "Tx sample number"
END_OBJECT          = COLUMN

OBJECT              = COLUMN
  NAME              = "TX_ADC_VALUE"
  DATA_TYPE        = ASCII_INTEGER
  START_BYTE        = 54
  BYTES             = 3
  UNIT              = "N/A"
  FORMAT            = "I3"
  DESCRIPTION       = "Tx ADC value "
END_OBJECT          = COLUMN
```

4.3.2.4.3.2.2 PP Health Check (HC) data  
Same as FM1

4.3.2.4.3.2.3 PP Langmuir Probe Test (LM) data  
Same as FM1

4.3.2.4.3.2.4 PP Passive Mode (PM) data

The PP PM data are organized as tables containing parameters and power spectra. The tables are kept in separate data files (combined detached labels). Consequently there will be one PDS label pointing to two data files.

Following is an example of PDS files corresponding to a PM measurement.

```
SES_FS2_PPM_070929214512_PM.LBL (label)
SES_FS2_PPM_070929214512_PAR.TAB (parameters)
SES_FS2_PPM_070929214512_POW.TAB (power spectrum)
```

The parameters are described by the following TABLE object.

```
OBJECT              = PM2PAR_TABLE
  NAME              = PM2PAR
  INTERCHANGE_FORMAT = ASCII
  ROWS              = 1
  COLUMNS          = 11
  ROW_BYTES         = 100
  ^STRUCTURE        = "PP_PM2_PAR.FMT"
END_OBJECT          = PM2PAR_TABLE
```

The structure of the parameters TABLE object is described in the file PP\_PM2\_PAR.FMT.

```
/* PP PM2 parameter settings, version 2, 2015-11-11 */
```

```
OBJECT              = COLUMN
```

```
NAME = "SESAME_SEQ_ID"
DATA_TYPE = ASCII_INTEGER
START_BYTE = 1
BYTES = 6
UNIT = "N/A"
FORMAT = "I6"
DESCRIPTION = "Sequence ID in the current data file"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "UTC"
DATA_TYPE = TIME
START_BYTE = 8
BYTES = 23
DESCRIPTION = "Measurement start time (UTC in PDS standard
format YYYY-MM-DDThh:mm:ss.sss)"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "SESAME_LOCAL_TIME"
DATA_TYPE = ASCII_INTEGER
START_BYTE = 32
BYTES = 15
FORMAT = "I15"
DESCRIPTION = "Measurement start time. SESAME local time
(SLT) runs with a resolution of 1/32 seconds.
SLT represents the least significant 32 bits
of LOBT. The most significant 5 bits are in
CDMS RSST (see SESAME Ready Message)"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "LP_INT_CLK_DIV"
DATA_TYPE = ASCII_INTEGER
START_BYTE = 48
BYTES = 2
UNIT = "N/A"
FORMAT = "I2"
DESCRIPTION = "The LP integrator clock divider determines
integrating time of Langmuir Probe (LP)
measurement "
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "LP_VALUE"
DATA_TYPE = ASCII_INTEGER
START_BYTE = 51
BYTES = 5
UNIT = "N/A"
FORMAT = "I5"
DESCRIPTION = "Result count of Langmuir probe measurement "
END_OBJECT = COLUMN
```

OBJECT = COLUMN  
NAME = "LP\_MEAS\_ERR"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 57  
BYTES = 8  
MISSING\_CONSTANT = 16#0000#  
DESCRIPTION = "Error code for LP measurement.  
Hex value as 16#xxxx#. The possible values are:  
8001 Invalid register address.  
8002 Error verifying register write.  
8004 Error accessing power register.  
8008 MUX setting not allowed.  
8010 Error accessing PP RAM.  
8020 Tried to start measurement but a measurement  
is already running.  
0040 Error during writing to instrument.  
0080 Error during reading from instrument.  
0100 Error using ADC of C-DPU.  
0200 Error during DAC table generation.  
0400 Calculated number of samples > N\_SAMP\_MAX.  
8800 C-DPU memory exhausted.  
9000 Measurement time out.  
2000 Invalid command parameter.  
8000 Flag indicates fatal error. "

END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "ADC\_CLK\_DIV"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 66  
BYTES = 5  
UNIT = "N/A"  
FORMAT = "I5"  
DESCRIPTION = "ADC clock divider used when generating the  
receiver sampling frequency: 5 MHz / this  
parameter "

END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "NB\_SAMPLES"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 72  
BYTES = 5  
UNIT = "N/A"  
FORMAT = "I5"  
DESCRIPTION = "Number of used samples (excluding skipped samples) "

END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "ERROR\_CODE"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 78  
BYTES = 8

```

UNIT = "N/A"
MISSING_CONSTANT = 16#0000#
DESCRIPTION = "Hex value as 16#xxxx#. The possible values are:
      8001 Invalid register address.
      8002 Error verifying register write.
      8004 Error accessing power register.
      8008 MUX setting not allowed.
      8010 Error accessing PP RAM.
      8020 Tried to start measurement but a measurement
            is already running.
      0040 Error during writing to instrument.
      0080 Error during reading from instrument.
      0100 Error using ADC of C-DPU.
      0200 Error during DAC table generation.
      0400 Calculated number of samples > N_SAMP_MAX.
      8800 C-DPU memory exhausted.
      9000 Measurement time out.
      2000 Invalid command parameter.
      8000 Flag indicates fatal error. "
END_OBJECT = COLUMN

OBJECT = COLUMN
  NAME = "NB_FREQ_BINS"
  DATA_TYPE = ASCII_INTEGER
  START_BYTE = 87
  BYTES = 2
  UNIT = "N/A"
  FORMAT = "I2"
  DESCRIPTION = "Number of frequency bins "
END_OBJECT = COLUMN

OBJECT = COLUMN
  NAME = "MATH_ERR_CODE"
  DATA_TYPE = ASCII_INTEGER
  START_BYTE = 90
  BYTES = 8
  UNIT = "N/A"
  MISSING_CONSTANT = 16#0000#
  DESCRIPTION = "Indicates errors, which can only occur during
on-board data reduction (hex value as 16#xxxx#).
      0001 Reduce: number of vector elements odd or less
            than 2; fatal.
      0002 Expand: less than four elements in input
            vector; fatal.
      0004 Too much data for analysis; truncating.
      0008 Too few data for analysis; padding with 128
      0010 Used number of waves is not a power of 2;
            truncated.
      0020 Not the expected number of elements in
            filtered arrays; fatal.
      0040 Argument for sine_table() not in valid range
            0<= deg2 <=720.
      0080 Overflow in divsin() or result inexact.
  
```

```
0100 Too few data for trimmed mean calculation;  
      regular mean used.  
0200 No data for warr.mean; particular: analysis  
      yields no data.  
0400 Passive mode: not enough data in bin.  
0800 Not enough memory for data reduction."  
END_OBJECT = COLUMN
```

The power spectrum is described by the following TABLE object.

```
OBJECT = PM2POW_TABLE  
NAME = PM2POW  
INTERCHANGE_FORMAT = ASCII  
ROWS = 1  
COLUMNS = 5  
ROW_BYTES = 63  
^STRUCTURE = "PP_PM2_POW.FMT"  
END_OBJECT = PM2POW_TABLE
```

The structure of the power spectrum TABLE object is described in the file PP\_PM2\_POW.FMT-

```
OBJECT = COLUMN  
NAME = "SESAME_SEQ_ID"  
DATA_TYPE = ASCII_INTEGER  
START_BYTE = 1  
BYTES = 6  
UNIT = "N/A"  
FORMAT = "I6"  
DESCRIPTION = "Sequence ID in the current data file"  
END_OBJECT = COLUMN
```

```
OBJECT = COLUMN  
NAME = "UTC"  
DATA_TYPE = TIME  
START_BYTE = 8  
BYTES = 23  
DESCRIPTION = "Measurement start time (UTC in PDS standard  
format YYYY-MM-DDThh:mm:ss.sss)"  
END_OBJECT = COLUMN
```

```
OBJECT = COLUMN  
NAME = "SESAME_LOCAL_TIME"  
DATA_TYPE = ASCII_INTEGER  
START_BYTE = 32  
BYTES = 15  
FORMAT = "I15"  
DESCRIPTION = "Measurement start time. SESAME local time  
(SLT) runs with a resolution of 1/32 seconds.  
SLT represents the least significant 32 bits  
of LOBT. The most significant 5 bits are in  
CDMS RSST (see SESAME Ready Message)"  
END_OBJECT = COLUMN
```

```

OBJECT          = COLUMN
  NAME          = "FREQ_BIN"
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 48
  BYTES         = 2
  FORMAT        = "I2"
  UNIT          = "N/A"
  DESCRIPTION   = "Frequency bins meaning:
                  1 20000-10000 Hz
                  2 10000-5000 Hz
                  3 5000-2500 Hz
                  4 2500-1250 Hz
                  5 1250-625 Hz
                  6 625-312 Hz
                  7 312-156 Hz
                  8 156-78 Hz
                  9 78-39 Hz
                  10 39-20 Hz "
```

```
END_OBJECT     = COLUMN
```

```

OBJECT          = COLUMN
  NAME          = "POWER"
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 51
  BYTES         = 10
  FORMAT        = "I10"
  UNIT          = "N/A"
  DESCRIPTION   = "Raw power"
  END_OBJECT    = COLUMN
```

#### 4.3.2.4.3.2.5 PP Passive Mode Test (PMTEST) data

The PP PMTEST2 data are organized as tables containing parameters, power spectra and receiver (Rx) time series. The tables are kept in separate data files (combined detached labels). Consequently there will be one PDS label pointing to three data files.

Following is an example of PDS files corresponding to a PMTEST measurement.

- SES\_FS2\_PPM\_070929214512\_TEST.LBL** (label)
- SES\_FS2\_PPM\_070929214512\_TPAR.TAB (parameters)
- SES\_FS2\_PPM\_070929214512\_TPOW.TAB (power spectrum)
- SES\_FS2\_PPM\_070929214512\_TRX.TAB (receiver time series)

The parameters are described by the following TABLE object.

```

OBJECT          = PM2TPAR_TABLE
  NAME          = PM2TPAR
  INTERCHANGE_FORMAT = ASCII
  ROWS          = 1
  COLUMNS      = 11
  ROW_BYTES     = 100
  ^STRUCTURE    = "PP_PMT2_PAR.FMT"
  END_OBJECT    = PM2TPAR_TABLE
```



The structure of the parameters TABLE object is described in the file PP\_PMT2\_PAR.FMT.

/\* PP PMTEST2 parameter settings, version 2, 2015-11-11 \*/

```
OBJECT          = COLUMN
  NAME          = "SESAME_SEQ_ID"
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 1
  BYTES         = 6
  UNIT          = "N/A"
  FORMAT        = "I6"
  DESCRIPTION   = "Sequence ID in the current data file"
END_OBJECT     = COLUMN

OBJECT          = COLUMN
  NAME          = "UTC"
  DATA_TYPE    = TIME
  START_BYTE    = 8
  BYTES         = 23
  DESCRIPTION   = "Measurement start time (UTC in PDS standard
                  format YYYY-MM-DDThh:mm:ss.sss)"
END_OBJECT     = COLUMN

OBJECT          = COLUMN
  NAME          = "SESAME_LOCAL_TIME"
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 32
  BYTES         = 15
  FORMAT        = "I15"
  DESCRIPTION   = "Measurement start time. SESAME local time
                  (SLT) runs with a resolution of 1/32 seconds.
                  SLT represents the least significant 32 bits
                  of LOBT. The most significant 5 bits are in
                  CDMS RSST (see SESAME Ready Message)"
END_OBJECT     = COLUMN

OBJECT          = COLUMN
  NAME          = "LP_INT_CLK_DIV"
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 48
  BYTES         = 2
  UNIT          = "N/A"
  FORMAT        = "I2"
  DESCRIPTION   = "The LP integrator clock divider determines
                  integrating time of Langmuir Probe (LP)
                  measurement "
END_OBJECT     = COLUMN

OBJECT          = COLUMN
  NAME          = "LP_VALUE"
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 51
  BYTES         = 5
  UNIT          = "N/A"
```

```

    FORMAT          = "I5"
    DESCRIPTION     = "Result count of Langmuir probe measurement "
END_OBJECT        = COLUMN

OBJECT            = COLUMN
    NAME           = "LP_MEAS_ERR"
    DATA_TYPE     = ASCII_INTEGER
    START_BYTE     = 57
    BYTES          = 8
    MISSING_CONSTANT = 16#0000#
    DESCRIPTION    = "Error code for LP measurement.
                    Hex value as 16#xxxx#. The possible values are:
                    8001 Invalid register address.
                    8002 Error verifying register write.
                    8004 Error accessing power register.
                    8008 MUX setting not allowed.
                    8010 Error accessing PP RAM.
                    8020 Tried to start measurement but a measurement
                        is already running.
                    0040 Error during writing to instrument.
                    0080 Error during reading from instrument.
                    0100 Error using ADC of C-DPU.
                    0200 Error during DAC table generation.
                    0400 Calculated number of samples > N_SAMP_MAX.
                    8800 C-DPU memory exhausted.
                    9000 Measurement time out.
                    2000 Invalid command parameter.
                    8000 Flag indicates fatal error. "
END_OBJECT        = COLUMN

OBJECT            = COLUMN
    NAME           = "ADC_CLK_DIV"
    DATA_TYPE     = ASCII_INTEGER
    START_BYTE     = 66
    BYTES          = 5
    UNIT           = "N/A"
    FORMAT         = "I5"
    DESCRIPTION    = "ADC clock divider used when generating the
                    receiver sampling frequency: 5 MHz / this
                    parameter "
END_OBJECT        = COLUMN

OBJECT            = COLUMN
    NAME           = "NB_SAMPLES"
    DATA_TYPE     = ASCII_INTEGER
    START_BYTE     = 72
    BYTES          = 5
    UNIT           = "N/A"
    FORMAT         = "I5"
    DESCRIPTION    = "Number of used samples (excluding skipped samples) "
END_OBJECT        = COLUMN

OBJECT            = COLUMN
```

```

NAME = "ERROR_CODE"
DATA_TYPE = ASCII_INTEGER
START_BYTE = 78
BYTES = 8
UNIT = "N/A"
MISSING_CONSTANT = 16#0000#
DESCRIPTION = "Hex value as 16#xxxx#. The possible values are:
      8001 Invalid register address.
      8002 Error verifying register write.
      8004 Error accessing power register.
      8008 MUX setting not allowed.
      8010 Error accessing PP RAM.
      8020 Tried to start measurement but a measurement
            is already running.
      0040 Error during writing to instrument.
      0080 Error during reading from instrument.
      0100 Error using ADC of C-DPU.
      0200 Error during DAC table generation.
      0400 Calculated number of samples > N_SAMP_MAX.
      8800 C-DPU memory exhausted.
      9000 Measurement time out.
      2000 Invalid command parameter.
      8000 Flag indicates fatal error. "
END_OBJECT = COLUMN

OBJECT = COLUMN
  NAME = "NB_FREQ_BINS"
  DATA_TYPE = ASCII_INTEGER
  START_BYTE = 87
  BYTES = 2
  UNIT = "N/A"
  FORMAT = "I2"
  DESCRIPTION = "Number of frequency bins "
END_OBJECT = COLUMN

OBJECT = COLUMN
  NAME = "MATH_ERR_CODE"
  DATA_TYPE = ASCII_INTEGER
  START_BYTE = 90
  BYTES = 8
  MISSING_CONSTANT = 16#0000#
  DESCRIPTION = "Indicates errors, which can only occur during
on-board data reduction (hex value as 16#xxxx#).
      0001 Reduce: number of vector elements odd or less
            than 2; fatal.
      0002 Expand: less than four elements in input
            vector; fatal.
      0004 Too much data for analysis; truncating.
      0008 Too few data for analysis; padding with 128
      0010 Used number of waves is not a power of 2;
            truncated.
      0020 Not the expected number of elements in
            filtered arrays; fatal.
  
```

```

0040 Argument for sine_table() not in valid range
      0<= deg2 <=720.
0080 Overflow in divsin() or result inexact.
0100 Too few data for trimmed mean calculation;
      regular mean used.
0200 No data for warr.mean; particular: analysis
      yields no data.
0400 Passive mode: not enough data in bin.
0800 Not enough memory for data reduction."
END_OBJECT      = COLUMN
  
```

The un-calibrated power spectrum is described by the following TABLE object.

```

OBJECT      = PM2TPOW_TABLE
NAME        = PM2TPOW
INTERCHANGE_FORMAT = ASCII
ROWS       = 1
COLUMNS   = 5
ROW_BYTES  = 63
^STRUCTURE = "PP_PM2_POW.FMT"
END_OBJECT  = PM2TPOW_TABLE
  
```

The structure of the parameters TABLE object is identical to PM (FM2, FM3) and is described in the file PP\_PM2\_POW.FMT.

/\* PP raw power values, version 2, 2015-11-11 \*/

```

OBJECT      = COLUMN
NAME        = "SESAME_SEQ_ID"
DATA_TYPE   = ASCII_INTEGER
START_BYTE  = 1
BYTES       = 6
UNIT        = "N/A"
FORMAT      = "I6"
DESCRIPTION = "Sequence ID in the current data file"
END_OBJECT  = COLUMN

OBJECT      = COLUMN
NAME        = "UTC"
DATA_TYPE   = TIME
START_BYTE  = 8
BYTES       = 23
DESCRIPTION = "Measurement start time (UTC in PDS standard
              format YYYY-MM-DDThh:mm:ss.sss)"
END_OBJECT  = COLUMN

OBJECT      = COLUMN
NAME        = "SESAME_LOCAL_TIME"
DATA_TYPE   = ASCII_INTEGER
START_BYTE  = 32
BYTES       = 15
FORMAT      = "I15"
  
```

```
DESCRIPTION = "Measurement start time. SESAME local time
              (SLT) runs with a resolution of 1/32 seconds.
              SLT represents the least significant 32 bits
              of LOBT. The most significant 5 bits are in
              CDMS RSST (see SESAME Ready Message)"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "FREQ_BIN"
DATA_TYPE = ASCII_INTEGER
START_BYTE = 48
BYTES = 2
FORMAT = "I2"
UNIT = "N/A"
DESCRIPTION = "Frequency bins meaning:
              1 20000-10000 Hz
              2 10000-5000 Hz
              3 5000-2500 Hz
              4 2500-1250 Hz
              5 1250-625 Hz
              6 625-312 Hz
              7 312-156 Hz
              8 156-78 Hz
              9 78-39 Hz
              10 39-20 Hz "
```

```
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "POWER"
DATA_TYPE = ASCII_INTEGER
START_BYTE = 51
BYTES = 10
FORMAT = "I10"
UNIT = "N/A"
DESCRIPTION = "Raw power"
END_OBJECT = COLUMN
```

The receiver data are described by the following TABLE object.

```
OBJECT = PM2TRX_TABLE
NAME = PM2TRX
INTERCHANGE_FORMAT = ASCII
ROWS = 8192
COLUMNS = 5
ROW_BYTES = 59
^STRUCTURE = "PP_PMT_RX.FMT"
END_OBJECT = PM2TRX_TABLE
```

The structure of the receiver data TABLE object is identical to PMTEST (FM1) and is described in the file PP\_PMT\_RX.FMT.

```
/* PP PMTEST / PMTEST2 Rx table entry ,version 2, 2015-11-11 */
```

```
OBJECT = COLUMN
```

```
NAME = "SESAME_SEQ_ID"
DATA_TYPE = ASCII_INTEGER
START_BYTE = 1
BYTES = 6
UNIT = "N/A"
FORMAT = "I6"
DESCRIPTION = "Sequence ID in the current data file"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "UTC"
DATA_TYPE = TIME
START_BYTE = 8
BYTES = 23
DESCRIPTION = "Measurement start time (UTC in PDS standard
format YYYY-MM-DDThh:mm:ss.sss)"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "SESAME_LOCAL_TIME"
DATA_TYPE = ASCII_INTEGER
START_BYTE = 32
BYTES = 15
FORMAT = "I15"
DESCRIPTION = "Measurement start time. SESAME local time
(SLT) runs with a resolution of 1/32 seconds.
SLT represents the least significant 32 bits
of LOBT. The most significant 5 bits are in
CDMS RSST (see SESAME Ready Message)"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "RX_SAMPLE "
DATA_TYPE = ASCII_INTEGER
START_BYTE = 48
BYTES = 5
UNIT = "N/A"
FORMAT = "I5"
DESCRIPTION = "Rx sample number"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "RX_ADC_VALUE"
DATA_TYPE = ASCII_INTEGER
START_BYTE = 54
BYTES = 3
UNIT = "N/A"
FORMAT = "I3"
DESCRIPTION = "RX ADC value "
END_OBJECT = COLUMN
```

#### 4.3.2.4.3.2.6 PP Control Table (RCTL) data

The Control Table is sent only on request, usually as verification after changes to the frequency definitions for mode FM\_AM2. The data files will be stored in the PP AM sub-directory as they define the details of the PP\_AM2 measurement sequence. The request command was planned for the LTS phase and was never be used.

#### 4.3.2.4.3.3 *Flight software version FM3*

##### 4.3.2.4.3.3.1 PP Active Mode Test

Same as FM2

##### 4.3.2.4.3.3.2 PP Health Check (HC) data

Same as FM1

##### 4.3.2.4.3.3.3 PP Langmuir Probe Test (LM) data

Same as FM1

##### 4.3.2.4.3.3.4 PP Passive Mode (PM) data

Same as FM2

##### 4.3.2.4.3.3.5 PP Passive Mode Test (PMTEST) data

Same as FM2

#### 4.3.2.5 Description of Instrument

The description of the instrument can be found in chapter 2.2 and as a brief overview in the INST.CAT catalog file.

#### 4.3.2.6 Mission Specific Keywords

ROSETTA: CASSE\_CHANNEL

- **Type** : ordered sequence
- **Description**: The CASSE\_CHANNEL ROSETTA mission specific keyword gives the type of measurement of each multiplexer channel.  
 The CASSE instrument is made of 3 piezoelectric transmitters and 3 triaxial accelerometers, and the respective electronics.  
 The transmitters and the 3 axes of each accelerometer are connected to an analogue 12-channel multiplexer.  
 It is possible to select any combination of 12 sensor channels, which can be the x, y, and z axes of each accelerometer and the 3 transmitters.  
 The sequence contains 12 elements representing the channel correspondence for CASSE measurements. These elements are flags that indicate if a channel is used or not. To increase readability, designations of used channels are given explicitly.  
 The sequence takes the following form: (channel 1, channel 2, ..., channel 12).
- **Standard values**: -YACCX, -YACCY, -YACCZ, +XACCX, +XACCY, +XACCZ, +YACCX, +YACCY, +YACCZ, -YTRM, +XTRM, +YTRM.  
 The unused channels take the value "-1".
- **Unit**: none

Explanation of acronym composition:

Characters 1,2: Philae foot (-Y, +X, +Y)

Characters 3,4,5: Sensor type (ACC: accelerometer; TRM: transmitter)

Character 6: ACC axis (X, Y, Z), if a triaxial accelerometer is used.

- **Examples**

Example 1:

CASSE\_CHANNEL = (-YACCX, -YACCY, -YACCZ, -1, -1,-1, -1, -1, -1, -1, -1, -1)

This means that all three channels of the accelerometer in the -Y foot are used.

Example 2:

CASSE\_CHANNEL = (-1, -1, -1, -1, -1, -1, -1, -1, -1, -YTRM, +XTRM, +YTRM)

This means that no accelerometer channel is used, but the transmitters of all three feet.

#### 4.3.2.7 Data quality definition (level 2)

##### 4.3.2.7.1 CASSE

The DATA\_QUALITY\_ID for CASSE is defined according to the fraction of time series with lost data (see level 1) and with ADC values of  $\pm 127$  compared to expected data volume.

The DATA\_QUALITY\_ID scheme is described by the associated DATA\_QUALITY\_DESC element as follows.

DATA\_QUALITY\_DESC = -1: NOT QUALIFIED

- 0: Data complete, 0% data loss
- 1: data loss < 5%
- 2:  $5\% \leq$  data loss < 10%
- 3:  $10\% \leq$  data loss < 20%
- 4: data loss  $\geq$  20%

##### 4.3.2.7.2 DIM

The DATA\_QUALITY\_ID for DIM is defined according to the operating mode, the number of warnings or errors and the fraction of data loss.

The following DATA\_QUALITY\_ID scheme is defined for the modes DIM\_HC, DIM\_AV and DIM\_BSTEST2.

DATA\_QUALITY\_DESC = -1: NOT QUALIFIED

- 0: Data complete
- 1: One or more Warnings
- 2: One or more Fatal Errors
- 3: N/A
- 4: N/A

The DATA\_QUALITY\_ID scheme for the DIM\_BC mode is calculated as follows.

If the number of "Detected Events" > 0 then

"Data loss" = (No. "Long Events" and no. "False Events") / (No. "Detected Events")

The following DATA\_QUALITY\_ID scheme is defined for the DIM\_BC mode.

DATA\_QUALITY\_DESC = -1: NOT QUALIFIED

- 0: Data complete
- 1: data loss or Warnings < 10%
- 2:  $10\% \leq$  data loss < 30%
- 3:  $30\% \leq$  data loss < 60%
- 4: data loss or Fatal Errors  $\geq$  60 %

The data from DIM\_MES will be handled like DIM\_BC or DIM\_AV, whatever is appropriate.

##### 4.3.2.7.3 PP

The DATA\_QUALITY\_ID for PP is defined according to the operating mode as follows.

###### 4.3.2.7.3.1 PP Health Check



DATA\_QUALITY\_DESC = -1: NOT QUALIFIED

- 0: Data complete; no errors
- 1: Disturbed signal: any raw parameter = 255 or 0
- 2: One or more Fatal Errors
- 3: N/A
- 4: N/A

#### 4.3.2.7.3.2 PP Active Mode and Active Mode Test (PP\_AM2, PP\_AMTEST2)

DATA\_QUALITY\_DESC = -1: NOT QUALIFIED

- 0: Data complete; no errors
- 1: All QUAL-flags = 0x0F, limited use
- 2: One or more Fatal Errors
- 3: N/A
- 4: N/A

#### 4.3.2.7.3.3 PP Passive Mode and Passive Mode Test (PP\_PM2, PP\_PMTEST2)

DATA\_QUALITY\_DESC = -1: NOT QUALIFIED

- 0: Data complete; no errors
- 1: Math Error code not equal 0, limited use
- 2: One or more Fatal Errors
- 3: N/A
- 4: N/A

#### 4.3.2.7.4 SESAME Health-Check

The criterion for the DATA\_QUALITY\_ID definition is the data loss versus expected data volume.

DATA\_QUALITY\_DESC = -1: NOT QUALIFIED

- 0: Data complete; no errors
- 1: data loss < 5%
- 2: 5% ≤ data loss < 10%
- 3: 10% ≤ data loss < 20%
- 4: data loss ≥ 20%

#### 4.3.2.7.5 SESAME common data object definition

The SESAME error messages are described by the following TABLE object.

```

OBJECT          = EMES_TABLE
  NAME          = EMES
  INTERCHANGE_FORMAT = ASCII
  ROWS          = 1
  COLUMNS      = 6
  ROW_BYTES     = 73
  ^STRUCTURE   = "SESAME_EMES.FMT"
END_OBJECT     = EMES_TABLE
  
```

The structure of the receiver data TABLE object is described in the file SESAME\_EMES.FMT.

```

OBJECT          = COLUMN
  NAME          = "UTC"
  DATA_TYPE    = TIME
  START_BYTE    = 1
  
```

```

    BYTES = 23
    DESCRIPTION = "Measurement start time (UTC in PDS standard
        format YYYY-MM-DDThh:mm:ss.sss)"
END_OBJECT = COLUMN

OBJECT = COLUMN
    NAME = "SESAME_LOCAL_TIME"
    DATA_TYPE = ASCII_INTEGER
    START_BYTE = 25
    BYTES = 15
    FORMAT = "I15"
    DESCRIPTION = "Start time of measurement. SESAME local time
        (SLT) runs with a resolution of 1/32 seconds.
        SLT represents the least significant 32 bits
        of LOBT. The most significant 5 bits are in
        CDMS RSST (see SESAME Ready Message)"
END_OBJECT = COLUMN

OBJECT = COLUMN
    NAME = "ERR_MSG_ID"
    DATA_TYPE = CHARACTER
    START_BYTE = 42
    BYTES = 14
    FORMAT = "A14"
    DESCRIPTION = "Identifying character string:
        Error Message"
END_OBJECT = COLUMN

OBJECT = COLUMN
    NAME = "ERR_CODE"
    DATA_TYPE = CHARACTER
    START_BYTE = 59
    BYTES = 4
    FORMAT = "A4"
    DESCRIPTION = "Error code word (hex value):
        1101 Tried to start A/D conversion, but ADC of
            C-DPU is in use
        1102 Unknown HK parameter ID, HK value set to
            HK_MISVAL
        1103 Tried to read A/D converted value, but
            conversion is not ready
        1406 Received CDMS message, which is not
            addressed to SESAME and is not a broadcast
            message; message ignored
        140A Received unknown CDMS data message (msgDATA)
        140C Unknown Action Code (newCDMSmsg!)
        140E Unknown Action Code (NewCDMSmsg?)
        1412 Wrong Word Count (rcvTRG)
        1414 Wrong parameters (check_actc)
        1601 Unknown command category, TC ignored
        1617 Unknown common TC
        1A01 Wrong temperature channel, set to default
        1A11 Unknown CASSE TC
        1B01 Invalid margin, set margin to 0
        1B02 Invalid direction, set direction to X
        1D01 Could not allocate memory (COM_MEM)
        1D03 Could not allocate memory (COM_HK)
        1D08 Error reading Backup RAM Buffer
        1D09 Error reading Stored TC Buffer
        E106 Could not allocate memory (COM_RBUF)
        E402 SESAME request buffer full
        E4D0 Received CDMS Error Code Word with contents 0
        E4D1 Received CDMS Error Code Word with contents 1
        E4D2 Received CDMS Error Code Word with contents 2
        E4D3 Received CDMS Error Code Word with contents 3
        E4D4 Received CDMS Error Code Word with contents 4
        E4D5 Received CDMS Error Code Word with contents 5
    
```

E4D6 Received CDMS Error Code Word with contents 6  
E4D7 Received CDMS Error Code Word with contents 7  
E4D8 Received CDMS Error Code Word with contents 8  
E4D9 Received CDMS Error Code Word with contents 9  
E4DA Received CDMS Error Code Word with contents A  
E4DB Received CDMS Error Code Word with contents B  
E4DC Received CDMS Error Code Word with contents C  
E4DD Received CDMS Error Code Word with contents D  
E4DE Received CDMS Error Code Word with contents E  
E4DF Received CDMS Error Code Word with contents F  
E501 Invalid case in module SDOUT  
EA20 Could not allocate memory (CAS\_HC)  
EA22 Could not submit measurement (CAS\_HC)  
EA24 Could not allocate memory (CAS\_MES)  
EA26 Could not submit SD (CAS\_MES)  
EAFF Allocated memory space exhausted  
EB20 Could not allocate memory (DIM\_CA)  
EB21 Could not submit SD (DIM\_CA)  
EB22 Could not allocate memory (DIM\_NT)  
EB23 Could not submit SD (DIM\_NT)  
EB24 Could not allocate memory (DIM\_ST)  
EB25 Could not submit SD (DIM\_ST)  
EB26 Could not allocate memory (DIM\_PC)  
EB27 Could not submit SD (DIM\_PC)  
EB28 Survey: Bad instrument health  
EB2A Could not allocate memory (DIM\_AV, DIM\_AVTEST)  
EB2B Could not submit SD (DIM\_AV, DIM\_AVTEST)  
EB2C Could not allocate memory (DIM\_BC, DIM\_BCTEST)  
EB2D Could not submit SD (DIM\_BC, DIM\_BCTEST)  
EB2E Autonomous Mode: Computed measurement  
duration for one AV- or BC-measurement  
derived from total measurement duration  
(TC parameter) is too small  
EB2F Autonomous Mode: Bad instrument health  
EB31 Survey: Allocated SRAM memory exhausted  
EB32 Survey: Excessive overcurrent interrupts  
EBF1 Unknown DIM TC  
EC30 Could not allocate memory (PP\_HC)  
EC31 Could not submit SD (PP\_HC)  
EC32 Could not allocate memory (PP\_DA)  
EC33 Could not submit SD (PP\_DA)  
EC52 Could not allocate memory (PP\_LM)  
EC53 Could not submit SD (PP\_LM)  
EC54 Could not allocate memory (PP\_AM)  
EC55 Could not submit SD (PP\_AM2)  
EC57 Could not allocate memory (PP\_AMTEST2)  
EC58 Could not submit SD (PP\_AMTEST2)  
EC5C Could not allocate memory (PP\_PM2)  
EC5D Could not submit SD (PP\_PM2)  
EC5E Could not allocate memory (PP\_PMTEST2)  
EC5F Could not submit SD (PP\_PMTEST2)  
ECE1 Unknown PP TC  
ED02 Could not submit SD (COM\_MEM)  
ED04 Could not submit SD (COM\_HK)  
ED05 Could not submit SD (COM\_RBUF)  
ED07 Timeout during Backup Buffer RAM reading  
ED0A Timeout during Stored TC Buffer reading  
ED0B Could not allocate memory (COM\_RDJC)  
ED0C Could not submit SD (COM\_RDJC)  
ED0D Could not allocate memory (COM\_WPENZ)  
ED0E Could not submit SD (COM\_WPENZ)"

END\_OBJECT

= COLUMN

```
OBJECT = COLUMN
NAME = "ERR_LEVEL"
DATA_TYPE = CHARACTER
START_BYTE = 66
BYTES = 1
FORMAT = "A1"
DESCRIPTION = "Error level (hex value):
    0 Information for debugging, no error
    1 Warning
    E Error
    F Fatal error, reboot required"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "ERR_SUBSYSTEM"
DATA_TYPE = CHARACTER
START_BYTE = 70
BYTES = 1
FORMAT = "A1"
DESCRIPTION = "Subsystem (hex value):
    0 Global routines
    1 ADC, HK
    4 CDMS I/F
    5 Science data processing
    6 Telecommand processing
    A CASSE S/W
    B DIM S/W
    C PP S/W
    D Common actions"
END_OBJECT = COLUMN
```

The SESAME health check parameters are described by the following TABLE object.

```
OBJECT = HC_TABLE
NAME = HC
INTERCHANGE_FORMAT = ASCII
ROWS = 1
COLUMNS = 69
ROW_BYTES = 621
^STRUCTURE = "SESAME_HC.FMT"
END_OBJECT = HC_TABLE
```

The structure of the receiver data TABLE object for FM1 and FM2 is described in the file SESAME\_HC.FMT.

```
OBJECT = COLUMN
NAME = "UTC"
DATA_TYPE = TIME
START_BYTE = 1
BYTES = 23
DESCRIPTION = "Measurement start time (UTC in PDS standard
    format YYYY-MM-DDThh:mm:ss.sss)"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "SESAME_LOCAL_TIME"
DATA_TYPE = ASCII_INTEGER
START_BYTE = 25
BYTES = 15
```

```
FORMAT      = "I15"
DESCRIPTION = "Measurement start time. SESAME local time
              (SLT) runs with a resolution of 1/32 seconds.
              SLT represents the least significant 32 bits
              of LOBT. The most significant 5 bits are in
              CDMS RSST (see SESAME Ready Message)"
END_OBJECT  = COLUMN

OBJECT      = COLUMN
NAME       = "CE_U+5"
DATA_TYPE  = ASCII_REAL
START_BYTE = 41
BYTES     = 5
FORMAT    = "F5.3"
UNIT      = "VOLT"
DESCRIPTION = "Common electronics +5V voltage "
END_OBJECT = COLUMN

OBJECT      = COLUMN
NAME       = "CE_U-5"
DATA_TYPE  = ASCII_REAL
START_BYTE = 47
BYTES     = 6
FORMAT    = "F6.3"
UNIT      = "VOLT"
DESCRIPTION = "Common electronics -5V voltage"
END_OBJECT = COLUMN

OBJECT      = COLUMN
NAME       = "CE_U+12"
DATA_TYPE  = ASCII_REAL
START_BYTE = 54
BYTES     = 6
FORMAT    = "F6.3"
UNIT      = "VOLT"
DESCRIPTION = "Common electronics +12V voltage "
END_OBJECT = COLUMN

OBJECT      = COLUMN
NAME       = "CE_U-12"
DATA_TYPE  = ASCII_REAL
START_BYTE = 61
BYTES     = 7
FORMAT    = "F7.3"
UNIT      = "VOLT"
DESCRIPTION = "Common electronics -12V voltage "
END_OBJECT = COLUMN

OBJECT      = COLUMN
NAME       = "CE_U+28"
DATA_TYPE  = ASCII_REAL
START_BYTE = 69
BYTES     = 6
```

FORMAT = "F6.3"  
UNIT = "VOLT"  
DESCRIPTION = "Common electronics +28V voltage"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "CE\_UCDP"  
DATA\_TYPE = ASCII\_REAL  
START\_BYTE = 76  
BYTES = 5  
FORMAT = "F5.3"  
UNIT = "VOLT"  
DESCRIPTION = "Common electronics  
Common DPU +5V voltage"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "CE\_I+5"  
DATA\_TYPE = ASCII\_REAL  
START\_BYTE = 82  
BYTES = 6  
FORMAT = "F6.2"  
UNIT = "MILLIAMPERE"  
DESCRIPTION = "Common electronics +5V current "  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "CE\_I-5"  
DATA\_TYPE = ASCII\_REAL  
START\_BYTE = 89  
BYTES = 6  
FORMAT = "F6.2"  
UNIT = "MILLIAMPERE"  
DESCRIPTION = "Common electronics -5V current "  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "CE\_I+12"  
DATA\_TYPE = ASCII\_REAL  
START\_BYTE = 96  
BYTES = 6  
FORMAT = "F6.2"  
UNIT = "MILLIAMPERE"  
DESCRIPTION = "Common electronics +12V current "  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "CE\_I-12"  
DATA\_TYPE = ASCII\_REAL  
START\_BYTE = 103  
BYTES = 6  
FORMAT = "F6.2"  
UNIT = "MILLIAMPERE"

DESCRIPTION = "Common electronics -12V current "  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "CE\_I+28"  
DATA\_TYPE = ASCII\_REAL  
START\_BYTE = 110  
BYTES = 6  
FORMAT = "F6.2"  
UNIT = "MILLIAMPERE"  
DESCRIPTION = "Common electronics +28V current "  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "CE\_SUPS"  
DATA\_TYPE = CHARACTER  
START\_BYTE = 118  
BYTES = 4  
FORMAT = "A4"  
UNIT = "N/A"  
DESCRIPTION = "Common electronics  
SRAM usage/power status (hex value) "  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "CE\_TBO"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 124  
BYTES = 6  
FORMAT = "I6"  
UNIT = "SECOND"  
DESCRIPTION = "Common electronics  
Time since boot "  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "CE\_ERRF"  
DATA\_TYPE = CHARACTER  
START\_BYTE = 132  
BYTES = 4  
FORMAT = "A4"  
UNIT = "N/A"  
DESCRIPTION = "Common electronics  
Error flags (hex value) "  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "CE\_CEID"  
DATA\_TYPE = CHARACTER  
START\_BYTE = 139  
BYTES = 4  
FORMAT = "A4"  
UNIT = "N/A"

```
DESCRIPTION = "Common electronics
                SESAME ID (hex value:B5E5) "
END_OBJECT   = COLUMN

OBJECT       = COLUMN
NAME        = "CE_CLTC"
DATA_TYPE   = CHARACTER
START_BYTE  = 146
BYTES       = 4
FORMAT      = "A4"
UNIT        = "N/A"
DESCRIPTION = "Common electronics
                Last received TC (hex value) "
END_OBJECT   = COLUMN

OBJECT       = COLUMN
NAME        = "CE_CBTC"
DATA_TYPE   = CHARACTER
START_BYTE  = 153
BYTES       = 4
FORMAT      = "A4"
UNIT        = "N/A"
DESCRIPTION = "Common electronics
                Last but one TC (hex value) "
END_OBJECT   = COLUMN

OBJECT       = COLUMN
NAME        = "CASSE_TT-Y"
DATA_TYPE   = ASCII_REAL
START_BYTE  = 159
BYTES       = 7
FORMAT      = "F7.2"
UNIT        = "KELVIN"
DESCRIPTION = "CASSE
                Foot -Y/TRM temperature
                The temperature range is limited by the range
                of the ADC of the C-DPU to (-104.52, 173.55)
                deg Celsius "
END_OBJECT   = COLUMN

OBJECT       = COLUMN
NAME        = "CASSE_TA-Y"
DATA_TYPE   = ASCII_REAL
START_BYTE  = 167
BYTES       = 7
FORMAT      = "F7.2"
UNIT        = "KELVIN"
DESCRIPTION = "CASSE
                Foot -Y/ACC temperature
                The temperature range is limited by the range
                of the ADC of the C-DPU to (-104.52, 173.55)
                deg Celsius "
END_OBJECT   = COLUMN
```



OBJECT = COLUMN  
NAME = "CASSE\_TT+X"  
DATA\_TYPE = ASCII\_REAL  
START\_BYTE = 175  
BYTES = 7  
FORMAT = "F7.2"  
UNIT = "KELVIN"  
DESCRIPTION = "CASSE  
Foot +X/TRM temperature  
The temperature range is limited by the range  
of the ADC of the C-DPU to (-104.52, 173.55)  
deg Celsius "  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "CASSE\_TA+X"  
DATA\_TYPE = ASCII\_REAL  
START\_BYTE = 183  
BYTES = 7  
FORMAT = "F7.2"  
UNIT = "KELVIN"  
DESCRIPTION = "CASSE  
Foot +X/ACC temperature  
The temperature range is limited by the range  
of the ADC of the C-DPU to (-104.52, 173.55)  
deg Celsius "  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "CASSE\_TT+Y"  
DATA\_TYPE = ASCII\_REAL  
START\_BYTE = 191  
BYTES = 7  
FORMAT = "F7.2"  
UNIT = "KELVIN"  
DESCRIPTION = "CASSE  
Foot +Y/TRM temperature  
The temperature range is limited by the range  
of the ADC of the C-DPU to (-104.52, 173.55)  
deg Celsius "  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "CASSE\_TA+Y"  
DATA\_TYPE = ASCII\_REAL  
START\_BYTE = 199  
BYTES = 7  
FORMAT = "F7.2"  
UNIT = "KELVIN"  
DESCRIPTION = "CASSE  
Foot +Y/ACC temperature  
The temperature range is limited by the range

of the ADC of the C-DPU to (-104.52, 173.55)

deg Celsius "

END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "CASSE\_TPCB"  
DATA\_TYPE = ASCII\_REAL  
START\_BYTE = 207  
BYTES = 7  
FORMAT = "F7.2"  
UNIT = "KELVIN"  
DESCRIPTION = "CASSE board temperature "  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "CASSE\_UFPG"  
DATA\_TYPE = ASCII\_REAL  
START\_BYTE = 215  
BYTES = 6  
FORMAT = "F6.3"  
UNIT = "VOLT"  
DESCRIPTION = "CASSE FPGA 3.3V "  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "CASSE\_URAD\_1S"  
DATA\_TYPE = ASCII\_REAL  
START\_BYTE = 222  
BYTES = 6  
FORMAT = "F6.3"  
UNIT = "VOLT"  
DESCRIPTION = "CASSE total dose (RADFET) "  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "DIM\_UD\_+5"  
DATA\_TYPE = ASCII\_REAL  
START\_BYTE = 229  
BYTES = 5  
FORMAT = "F5.3"  
UNIT = "VOLT"  
DESCRIPTION = "DIM +5V voltage "  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "DIM\_UD\_-5"  
DATA\_TYPE = ASCII\_REAL  
START\_BYTE = 235  
BYTES = 6  
FORMAT = "F6.3"  
UNIT = "VOLT"  
DESCRIPTION = "DIM -5V voltage "  
END\_OBJECT = COLUMN

```
OBJECT                = COLUMN
  NAME                 = "PP_UP_+5"
  DATA_TYPE           = ASCII_REAL
  START_BYTE           = 242
  BYTES                = 5
  FORMAT               = "F5.3"
  UNIT                 = "VOLT"
  DESCRIPTION          = "PP +5V voltage "
END_OBJECT            = COLUMN
```

```
OBJECT                = COLUMN
  NAME                 = "PP_D"
  DATA_TYPE           = ASCII_INTEGER
  START_BYTE           = 248
  BYTES                = 5
  FORMAT               = "I5"
  UNIT                 = "N/A"
  DESCRIPTION          = "PP electron density "
END_OBJECT            = COLUMN
```

```
OBJECT                = COLUMN
  NAME                 = "PP_IP_-5"
  DATA_TYPE           = ASCII_REAL
  START_BYTE           = 254
  BYTES                = 6
  FORMAT               = "F6.3"
  UNIT                 = "MILLIAMPERE"
  DESCRIPTION          = "PP the current consumption of the PP digital
                        electronics. The difference between UP+5 and
                        the incoming +5 V supply voltage (U+05) is the
                        voltage drop caused by the current (IP-5) through
                        a 11.1 Ohm resistor. "
END_OBJECT            = COLUMN
```

```
OBJECT                = COLUMN
  NAME                 = "SESAME_LOCAL_TIME_MEAS"
  DATA_TYPE           = CHARACTER
  START_BYTE           = 262
  BYTES                = 8
  FORMAT               = "A8"
  MISSING_CONSTANT    = "99999999"
  DESCRIPTION          = "Start time of each measurement. SESAME
                        local time runs with a resolution of 31.25 ms
                        represented in hexa value.
                        Does not exist for Software Version FM1"
END_OBJECT            = COLUMN
```

```
OBJECT                = COLUMN
  NAME                 = "T-HK_CHANNEL1"
  DATA_TYPE           = ASCII_REAL
  START_BYTE           = 272
  BYTES                = 7
```

```
FORMAT          = "F7.2"
UNIT            = "KELVIN"
MISSING_CONSTANT = 9999.99
DESCRIPTION = "Voltage of temperature channel using
              regular HK measurement, for Foot -Y/TRM
              Does not exist for Software Version FM1"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
NAME           = "T-I1_CHANNEL1"
DATA_TYPE      = ASCII_REAL
START_BYTE     = 280
BYTES          = 7
FORMAT         = "F7.2"
UNIT           = "KELVIN"
MISSING_CONSTANT = 9999.99
DESCRIPTION = "Intermediate voltage measured shortly after
              switching from temperature channel to to reference
              channel 1, for Foot -Y/TRM
              Does not exist for Software Version FM1"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
NAME           = "T-R1_CHANNEL1"
DATA_TYPE      = ASCII_REAL
START_BYTE     = 288
BYTES          = 7
FORMAT         = "F7.2"
UNIT           = "KELVIN"
MISSING_CONSTANT = 9999.99
DESCRIPTION = "voltage of reference channel 1 = UCDP,
              for Foot -Y/TRM
              Does not exist for Software Version FM1"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
NAME           = "T-I2_CHANNEL1"
DATA_TYPE      = ASCII_REAL
START_BYTE     = 296
BYTES          = 7
FORMAT         = "F7.2"
UNIT           = "KELVIN"
MISSING_CONSTANT = 9999.99
DESCRIPTION = "Intermediate voltage measured shortly after
              switching from temperature channel to to reference
              channel 2, for Foot -Y/TRM
              Does not exist for Software Version FM1"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
NAME           = "T-R1_CHANNEL1"
DATA_TYPE      = ASCII_REAL
START_BYTE     = 304
```

BYTES = 7  
FORMAT = "F7.2"  
UNIT = "KELVIN"  
MISSING\_CONSTANT = 9999.99  
DESCRIPTION = "voltage of reference channel 2 = U + 28,  
for Foot -Y/TRM  
Does not exist for Software Version FM1"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "T-HK\_CHANNEL2"  
DATA\_TYPE = ASCII\_REAL  
START\_BYTE = 312  
BYTES = 7  
FORMAT = "F7.2"  
UNIT = "KELVIN"  
MISSING\_CONSTANT = 9999.99  
DESCRIPTION = "Voltage of temperature channel using  
regular HK measurement, for Foot -Y/ACC  
Does not exist for Software Version FM1"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "T-I1\_CHANNEL2"  
DATA\_TYPE = ASCII\_REAL  
START\_BYTE = 320  
BYTES = 7  
FORMAT = "F7.2"  
UNIT = "KELVIN"  
MISSING\_CONSTANT = 9999.99  
DESCRIPTION = "Intermediate voltage measured shortly after  
switching from temperature channel to to reference  
channel 1, for Foot -Y/ACC  
Does not exist for Software Version FM1"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "T-R1\_CHANNEL2"  
DATA\_TYPE = ASCII\_REAL  
START\_BYTE = 328  
BYTES = 7  
FORMAT = "F7.2"  
UNIT = "KELVIN"  
MISSING\_CONSTANT = 9999.99  
DESCRIPTION = "voltage of reference channel 1 = UCDP,  
for Foot -Y/ACC  
Does not exist for Software Version FM1"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "T-I2\_CHANNEL2"  
DATA\_TYPE = ASCII\_REAL  
START\_BYTE = 336

```
BYTES = 7
FORMAT = "F7.2"
UNIT = "KELVIN"
MISSING_CONSTANT = 9999.99
DESCRIPTION = "Intermediate voltage measured shortly after
switching from temperature channel to to reference
channel 2, for Foot -Y/ACC
Does not exist for Software Version FM1"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "T-R1_CHANNEL2"
DATA_TYPE = ASCII_REAL
START_BYTE = 344
BYTES = 7
FORMAT = "F7.2"
UNIT = "KELVIN"
MISSING_CONSTANT = 9999.99
DESCRIPTION = "voltage of reference channel 2 = U + 28,
for Foot -Y/ACC
Does not exist for Software Version FM1"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "T-HK_CHANNEL3"
DATA_TYPE = ASCII_REAL
START_BYTE = 352
BYTES = 7
FORMAT = "F7.2"
UNIT = "KELVIN"
MISSING_CONSTANT = 9999.99
DESCRIPTION = "Voltage of temperature channel using
regular HK measurement, for Foot +X/TRM
Does not exist for Software Version FM1"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "T-I1_CHANNEL3"
DATA_TYPE = ASCII_REAL
START_BYTE = 360
BYTES = 7
FORMAT = "F7.2"
UNIT = "KELVIN"
MISSING_CONSTANT = 9999.99
DESCRIPTION = "Intermediate voltage measured shortly after
switching from temperature channel to to reference
channel 1, for Foot +X/TRM
Does not exist for Software Version FM1"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "T-R1_CHANNEL3"
DATA_TYPE = ASCII_REAL
```

```

START_BYTE = 368
BYTES      = 7
FORMAT     = "F7.2"
UNIT       = "KELVIN"
MISSING_CONSTANT = 9999.99
DESCRIPTION = "voltage of reference channel 1 = UCDP,
              for Foot +X/TRM
              Does not exist for Software Version FM1"
END_OBJECT = COLUMN

OBJECT     = COLUMN
NAME       = "T-I2_CHANNEL3"
DATA_TYPE  = ASCII_REAL
START_BYTE = 376
BYTES      = 7
FORMAT     = "F7.2"
UNIT       = "KELVIN"
MISSING_CONSTANT = 9999.99
DESCRIPTION = "Intermediate voltage measured shortly after
              switching from temperature channel to to reference
              channel 2, for Foot +X/TRM
              Does not exist for Software Version FM1"
END_OBJECT = COLUMN

OBJECT     = COLUMN
NAME       = "T-R1_CHANNEL3"
DATA_TYPE  = ASCII_REAL
START_BYTE = 384
BYTES      = 7
FORMAT     = "F7.2"
UNIT       = "KELVIN"
MISSING_CONSTANT = 9999.99
DESCRIPTION = "voltage of reference channel 2 = U + 28,
              for Foot +X/TRM
              Does not exist for Software Version FM1"
END_OBJECT = COLUMN

OBJECT     = COLUMN
NAME       = "T-HK_CHANNEL4"
DATA_TYPE  = ASCII_REAL
START_BYTE = 392
BYTES      = 7
FORMAT     = "F7.2"
UNIT       = "KELVIN"
MISSING_CONSTANT = 9999.99
DESCRIPTION = "Voltage of temperature channel using
              regular HK measurement, for Foot +X/ACC
              Does not exist for Software Version FM1"
END_OBJECT = COLUMN

OBJECT     = COLUMN
NAME       = "T-I1_CHANNEL4"
DATA_TYPE  = ASCII_REAL
    
```

```

START_BYTE = 400
BYTES      = 7
FORMAT     = "F7.2"
UNIT       = "KELVIN"
MISSING_CONSTANT = 9999.99
DESCRIPTION = "Intermediate voltage measured shortly after
              switching from temperature channel to to reference
              channel 1, for Foot +X/ACC
              Does not exist for Software Version FM1"
END_OBJECT = COLUMN
  
```

```

OBJECT      = COLUMN
NAME        = "T-R1_CHANNEL4"
DATA_TYPE   = ASCII_REAL
START_BYTE  = 408
BYTES      = 7
FORMAT     = "F7.2"
UNIT       = "KELVIN"
MISSING_CONSTANT = 9999.99
DESCRIPTION = "voltage of reference channel 1 = UCDP,
              for Foot +X/ACC
              Does not exist for Software Version FM1"
END_OBJECT  = COLUMN
  
```

```

OBJECT      = COLUMN
NAME        = "T-I2_CHANNEL4"
DATA_TYPE   = ASCII_REAL
START_BYTE  = 416
BYTES      = 7
FORMAT     = "F7.2"
UNIT       = "KELVIN"
MISSING_CONSTANT = 9999.99
DESCRIPTION = "Intermediate voltage measured shortly after
              switching from temperature channel to to reference
              channel 2, for Foot +X/ACC
              Does not exist for Software Version FM1"
END_OBJECT  = COLUMN
  
```

```

OBJECT      = COLUMN
NAME        = "T-R1_CHANNEL4"
DATA_TYPE   = ASCII_REAL
START_BYTE  = 424
BYTES      = 7
FORMAT     = "F7.2"
UNIT       = "KELVIN"
MISSING_CONSTANT = 9999.99
DESCRIPTION = "voltage of reference channel 2 = U + 28,
              for Foot +X/ACC
              Does not exist for Software Version FM1"
END_OBJECT  = COLUMN
  
```

```

OBJECT      = COLUMN
NAME        = "T-HK_CHANNEL5"
  
```



```
DATA_TYPE = ASCII_REAL
START_BYTE = 432
BYTES = 7
FORMAT = "F7.2"
UNIT = "KELVIN"
MISSING_CONSTANT = 9999.99
DESCRIPTION = "Voltage of temperature channel using
              regular HK measurement, for Foot +Y/TRM
              Does not exist for Software Version FM1"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "T-I1_CHANNEL5"
DATA_TYPE = ASCII_REAL
START_BYTE = 440
BYTES = 7
FORMAT = "F7.2"
UNIT = "KELVIN"
MISSING_CONSTANT = 9999.99
DESCRIPTION = "Intermediate voltage measured shortly after
              switching from temperature channel to to reference
              channel 1, for Foot +Y/TRM
              Does not exist for Software Version FM1"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "T-R1_CHANNEL5"
DATA_TYPE = ASCII_REAL
START_BYTE = 448
BYTES = 7
FORMAT = "F7.2"
UNIT = "KELVIN"
MISSING_CONSTANT = 9999.99
DESCRIPTION = "voltage of reference channel 1 = UCDP,
              for Foot +Y/TRM
              Does not exist for Software Version FM1"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "T-I2_CHANNEL5"
DATA_TYPE = ASCII_REAL
START_BYTE = 456
BYTES = 7
FORMAT = "F7.2"
UNIT = "KELVIN"
MISSING_CONSTANT = 9999.99
DESCRIPTION = "Intermediate voltage measured shortly after
              switching from temperature channel to to reference
              channel 2, for Foot +Y/TRM
              Does not exist for Software Version FM1"
END_OBJECT = COLUMN

OBJECT = COLUMN
```

```
NAME = "T-R1_CHANNEL5"
DATA_TYPE = ASCII_REAL
START_BYTE = 464
BYTES = 7
FORMAT = "F7.2"
UNIT = "KELVIN"
MISSING_CONSTANT = 9999.99
DESCRIPTION = "voltage of reference channel 2 = U + 28,
              for Foot +Y/TRM
              Does not exist for Software Version FM1"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "T-HK_CHANNEL6"
DATA_TYPE = ASCII_REAL
START_BYTE = 472
BYTES = 7
FORMAT = "F7.2"
UNIT = "KELVIN"
MISSING_CONSTANT = 9999.99
DESCRIPTION = "Voltage of temperature channel using
              regular HK measurement, for Foot +Y/ACC
              Does not exist for Software Version FM1"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "T-I1_CHANNEL6"
DATA_TYPE = ASCII_REAL
START_BYTE = 480
BYTES = 7
FORMAT = "F7.2"
UNIT = "KELVIN"
MISSING_CONSTANT = 9999.99
DESCRIPTION = "Intermediate voltage measured shortly after
              switching from temperature channel to to reference
              channel 1, for Foot +Y/ACC
              Does not exist for Software Version FM1"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "T-R1_CHANNEL6"
DATA_TYPE = ASCII_REAL
START_BYTE = 488
BYTES = 7
FORMAT = "F7.2"
UNIT = "KELVIN"
MISSING_CONSTANT = 9999.99
DESCRIPTION = "voltage of reference channel 1 = UCDP,
              for Foot +Y/ACC
              Does not exist for Software Version FM1"
END_OBJECT = COLUMN

OBJECT = COLUMN
```

```
NAME = "T-I2_CHANNEL6"
DATA_TYPE = ASCII_REAL
START_BYTE = 496
BYTES = 7
FORMAT = "F7.2"
UNIT = "KELVIN"
MISSING_CONSTANT = 9999.99
DESCRIPTION = "Intermediate voltage measured shortly after
switching from temperature channel to to reference
channel 2, for Foot +Y/ACC
Does not exist for Software Version FM1"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "T-R1_CHANNEL6"
DATA_TYPE = ASCII_REAL
START_BYTE = 504
BYTES = 7
FORMAT = "F7.2"
UNIT = "KELVIN"
MISSING_CONSTANT = 9999.99
DESCRIPTION = "voltage of reference channel 2 = U + 28,
for Foot +Y/ACC
Does not exist for Software Version FM1"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "T-HK_CHANNEL7"
DATA_TYPE = ASCII_REAL
START_BYTE = 512
BYTES = 7
FORMAT = "F7.2"
UNIT = "KELVIN"
MISSING_CONSTANT = 9999.99
DESCRIPTION = "Voltage of temperature channel using
regular HK measurement, for CASSE PCB temperature
Does not exist for Software Version FM1 "
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "T-I1_CHANNEL7"
DATA_TYPE = ASCII_REAL
START_BYTE = 520
BYTES = 7
FORMAT = "F7.2"
UNIT = "KELVIN"
MISSING_CONSTANT = 9999.99
DESCRIPTION = "Intermediate voltage measured shortly after
switching from temperature channel to to reference
channel 1, for CASSE PCB temperature
Does not exist for Software Version FM1 "
END_OBJECT = COLUMN
```

```
OBJECT = COLUMN
NAME = "T-R1_CHANNEL7"
DATA_TYPE = ASCII_REAL
START_BYTE = 528
BYTES = 7
FORMAT = "F7.2"
UNIT = "KELVIN"
MISSING_CONSTANT = 9999.99
DESCRIPTION = "voltage of reference channel 1 = UCDP,
              for CASSE PCB temperature
              Does not exist for Software Version FM1"
END_OBJECT = COLUMN
```

```
OBJECT = COLUMN
NAME = "T-I2_CHANNEL7"
DATA_TYPE = ASCII_REAL
START_BYTE = 536
BYTES = 7
FORMAT = "F7.2"
UNIT = "KELVIN"
MISSING_CONSTANT = 9999.99
DESCRIPTION = "Intermediate voltage measured shortly after
              switching from temperature channel to to reference
              channel 2, for CASSE PCB temperature
              Does not exist for Software Version FM1"
END_OBJECT = COLUMN
```

```
OBJECT = COLUMN
NAME = "T-R1_CHANNEL7"
DATA_TYPE = ASCII_REAL
START_BYTE = 544
BYTES = 7
FORMAT = "F7.2"
UNIT = "KELVIN"
MISSING_CONSTANT = 9999.99
DESCRIPTION = "voltage of reference channel 2 = U + 28,
              for CASSE PCB temperature
              Does not exist for Software Version FM1"
END_OBJECT = COLUMN
```

The structure of the receiver data TABLE object for FM3 is described in the file SESAME\_HC\_FM3.FMT.

```
/* FILE_CONTENTS = SESAME Health Check */
/* Flight software FM3, CODMAC level 3 */
/* FILE_NAME = SESAME_HC_FM3.FMT */
/* REVISION_NOTE = SESAME/DIM team, version 1, 2015-11-04 */
/* K. Seidensticker, version 2, 2015-11-04 */
/* W. Schmidt, version 4, 2015-11-11 */
```

```
OBJECT = COLUMN
NAME = "UTC"
DATA_TYPE = TIME
START_BYTE = 1
```

```

    BYTES = 23
    DESCRIPTION = "Measurement start time (UTC in PDS standard
                  format YYYY-MM-DDThh:mm:ss.sss)"
END_OBJECT = COLUMN

OBJECT = COLUMN
  NAME = "SESAME_LOCAL_TIME"
  DATA_TYPE = ASCII_INTEGER
  START_BYTE = 25
  BYTES = 15
  FORMAT = "I15"
  DESCRIPTION = "Measurement start time. SESAME local time
                (SLT) runs with a resolution of 1/32 seconds.
                SLT represents the least significant 32 bits
                of LOBT. The most significant 5 bits are in
                CDMS RSST (see SESAME Ready Message)"
END_OBJECT = COLUMN

OBJECT = COLUMN
  NAME = "U+05"
  DATA_TYPE = ASCII_REAL
  START_BYTE = 41
  BYTES = 8
  FORMAT = "F8.3"
  UNIT = "VOLT"
  MISSING_CONSTANT = 9999.999
  DESCRIPTION = "Common electronics +5V voltage"
END_OBJECT = COLUMN

OBJECT = COLUMN
  NAME = "U-05"
  DATA_TYPE = ASCII_REAL
  START_BYTE = 50
  BYTES = 8
  FORMAT = "F8.3"
  UNIT = "VOLT"
  MISSING_CONSTANT = 9999.999
  DESCRIPTION = "Common electronics -5V voltage"
END_OBJECT = COLUMN

OBJECT = COLUMN
  NAME = "U+12"
  DATA_TYPE = ASCII_REAL
  START_BYTE = 59
  BYTES = 8
  FORMAT = "F8.3"
  UNIT = "VOLT"
  MISSING_CONSTANT = 9999.999
  DESCRIPTION = "Common electronics +12V voltage"
END_OBJECT = COLUMN

OBJECT = COLUMN
  NAME = "U-12"

```

DATA\_TYPE = ASCII\_REAL  
START\_BYTE = 68  
BYTES = 8  
FORMAT = "F8.3"  
UNIT = "VOLT"  
MISSING\_CONSTANT = 9999.999  
DESCRIPTION = "Common electronics -12V voltage"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "U+28"  
DATA\_TYPE = ASCII\_REAL  
START\_BYTE = 77  
BYTES = 8  
FORMAT = "F8.3"  
UNIT = "VOLT"  
MISSING\_CONSTANT = 9999.999  
DESCRIPTION = "Common electronics +28V voltage"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "UCDP"  
DATA\_TYPE = ASCII\_REAL  
START\_BYTE = 86  
BYTES = 8  
FORMAT = "F8.3"  
UNIT = "VOLT"  
MISSING\_CONSTANT = 9999.999  
DESCRIPTION = "Common electronics  
Common DPU +5V voltage"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "I+05"  
DATA\_TYPE = ASCII\_REAL  
START\_BYTE = 95  
BYTES = 8  
FORMAT = "F8.3"  
UNIT = "MILLIAMPERE"  
MISSING\_CONSTANT = 9999.999  
DESCRIPTION = "Common electronics +5V current"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "I-05"  
DATA\_TYPE = ASCII\_REAL  
START\_BYTE = 104  
BYTES = 8  
FORMAT = "F8.3"  
UNIT = "MILLIAMPERE"  
MISSING\_CONSTANT = 9999.999  
DESCRIPTION = "Common electronics -5V current"  
END\_OBJECT = COLUMN

```
OBJECT = COLUMN
  NAME = "I+12"
  DATA_TYPE = ASCII_REAL
  START_BYTE = 113
  BYTES = 8
  FORMAT = "F8.3"
  UNIT = "MILLIAMPERE"
  MISSING_CONSTANT = 9999.999
  DESCRIPTION = "Common electronics +12V current"
END_OBJECT = COLUMN
```

```
OBJECT = COLUMN
  NAME = "I-12"
  DATA_TYPE = ASCII_REAL
  START_BYTE = 122
  BYTES = 8
  FORMAT = "F8.3"
  UNIT = "MILLIAMPERE"
  MISSING_CONSTANT = 9999.999
  DESCRIPTION = "Common electronics -12V current"
END_OBJECT = COLUMN
```

```
OBJECT = COLUMN
  NAME = "I+28"
  DATA_TYPE = ASCII_REAL
  START_BYTE = 131
  BYTES = 8
  FORMAT = "F8.3"
  UNIT = "MILLIAMPERE"
  MISSING_CONSTANT = 9999.999
  DESCRIPTION = "Common electronics +28V current"
END_OBJECT = COLUMN
```

```
OBJECT = COLUMN
  NAME = "SUPS"
  DATA_TYPE = ASCII_INTEGER
  START_BYTE = 140
  BYTES = 8
  UNIT = "N/A"
  MISSING_CONSTANT = 16#FFFF#
  DESCRIPTION = "Common electronics; SRAM usage/
  power status (hex value as 16#xxxx#)"
END_OBJECT = COLUMN
```

```
OBJECT = COLUMN
  NAME = "TIBO"
  DATA_TYPE = ASCII_INTEGER
  START_BYTE = 149
  BYTES = 6
  FORMAT = "I6"
  UNIT = "SECOND"
  MISSING_CONSTANT = 999999
```

```
DESCRIPTION = "Common electronics
              Time since boot"
END_OBJECT = COLUMN

OBJECT = COLUMN
  NAME = "ERRF"
  DATA_TYPE = ASCII_INTEGER
  START_BYTE = 156
  BYTES = 8
  UNIT = "N/A"
  MISSING_CONSTANT = 16#FFFF#
  DESCRIPTION = "Common electronics
                Error flags (hex value as 16#xxxx#)"
END_OBJECT = COLUMN

OBJECT = COLUMN
  NAME = "CEID"
  DATA_TYPE = ASCII_INTEGER
  START_BYTE = 165
  BYTES = 8
  UNIT = "N/A"
  MISSING_CONSTANT = 16#FFFF#
  DESCRIPTION = "Common electronics; SESAME flight
                software ID (hex value, FM3: 16#C5E5#)"
END_OBJECT = COLUMN

OBJECT = COLUMN
  NAME = "CLTC"
  DATA_TYPE = ASCII_INTEGER
  START_BYTE = 174
  BYTES = 8
  UNIT = "N/A"
  MISSING_CONSTANT = 16#FFFF#
  DESCRIPTION = "Common electronics; Last received TC
                (hex value as 16#xxxx#)"
END_OBJECT = COLUMN

OBJECT = COLUMN
  NAME = "CBTC"
  DATA_TYPE = ASCII_INTEGER
  START_BYTE = 183
  BYTES = 8
  UNIT = "N/A"
  MISSING_CONSTANT = 16#FFFF#
  DESCRIPTION = "Common electronics; Last but one TC
                (hex value as 16#xxxx#)"
END_OBJECT = COLUMN

OBJECT = COLUMN
  NAME = "TT-Y"
  DATA_TYPE = ASCII_REAL
  START_BYTE = 192
  BYTES = 8
```



```

    FORMAT           = "F8.3"
    UNIT             = "KELVIN"
    MISSING_CONSTANT = 9999.999
    DESCRIPTION      = "CASSE
                        Foot -Y/TRM temperature"
END_OBJECT          = COLUMN

OBJECT              = COLUMN
  NAME              = "TA-Y"
  DATA_TYPE        = ASCII_REAL
  START_BYTE        = 201
  BYTES             = 8
  FORMAT           = "F8.3"
  UNIT             = "KELVIN"
  MISSING_CONSTANT = 9999.999
  DESCRIPTION      = "CASSE
                        Foot -Y/ACC temperature"
END_OBJECT          = COLUMN

OBJECT              = COLUMN
  NAME              = "TT+X"
  DATA_TYPE        = ASCII_REAL
  START_BYTE        = 210
  BYTES             = 8
  FORMAT           = "F8.3"
  UNIT             = "KELVIN"
  MISSING_CONSTANT = 9999.999
  DESCRIPTION      = "CASSE
                        Foot +X/TRM temperature"
END_OBJECT          = COLUMN

OBJECT              = COLUMN
  NAME              = "TA+X"
  DATA_TYPE        = ASCII_REAL
  START_BYTE        = 219
  BYTES             = 8
  FORMAT           = "F8.3"
  UNIT             = "KELVIN"
  MISSING_CONSTANT = 9999.999
  DESCRIPTION      = "CASSE
                        Foot +X/ACC temperature"
END_OBJECT          = COLUMN

OBJECT              = COLUMN
  NAME              = "TT+Y"
  DATA_TYPE        = ASCII_REAL
  START_BYTE        = 228
  BYTES             = 8
  FORMAT           = "F8.3"
  UNIT             = "KELVIN"
  MISSING_CONSTANT = 9999.999
  DESCRIPTION      = "CASSE
                        Foot +Y/TRM temperature"
  
```

END\_OBJECT = COLUMN

OBJECT = COLUMN

NAME = "TA+Y"

DATA\_TYPE = ASCII\_REAL

START\_BYTE = 237

BYTES = 8

FORMAT = "F8.3"

UNIT = "KELVIN"

MISSING\_CONSTANT = 9999.999

DESCRIPTION = "CASSE  
Foot +Y/ACC temperature"

END\_OBJECT = COLUMN

OBJECT = COLUMN

NAME = "TPCB"

DATA\_TYPE = ASCII\_REAL

START\_BYTE = 246

BYTES = 8

FORMAT = "F8.3"

UNIT = "KELVIN"

MISSING\_CONSTANT = 9999.999

DESCRIPTION = "CASSE board temperature"

END\_OBJECT = COLUMN

OBJECT = COLUMN

NAME = "UFPG"

DATA\_TYPE = ASCII\_REAL

START\_BYTE = 255

BYTES = 8

FORMAT = "F8.3"

UNIT = "VOLT"

MISSING\_CONSTANT = 9999.999

DESCRIPTION = "CASSE FPGA 3.3V voltage"

END\_OBJECT = COLUMN

OBJECT = COLUMN

NAME = "URAD"

DATA\_TYPE = ASCII\_REAL

START\_BYTE = 264

BYTES = 8

FORMAT = "F8.3"

UNIT = "VOLT"

MISSING\_CONSTANT = 9999.999

DESCRIPTION = "CASSE total dose (RadFET)"

END\_OBJECT = COLUMN

OBJECT = COLUMN

NAME = "UD+5"

DATA\_TYPE = ASCII\_REAL

START\_BYTE = 273

BYTES = 8

FORMAT = "F8.3"

```

UNIT = "VOLT"
MISSING_CONSTANT = 9999.999
DESCRIPTION = "DIM +5V voltage"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "UD-5"
DATA_TYPE = ASCII_REAL
START_BYTE = 282
BYTES = 8
FORMAT = "F8.3"
UNIT = "VOLT"
MISSING_CONSTANT = 9999.999
DESCRIPTION = "DIM -5V voltage"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "UP+5"
DATA_TYPE = ASCII_REAL
START_BYTE = 291
BYTES = 8
FORMAT = "F8.3"
UNIT = "VOLT"
MISSING_CONSTANT = 9999.999
DESCRIPTION = "PP +5V voltage"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "PPD"
DATA_TYPE = ASCII_INTEGER
START_BYTE = 300
BYTES = 5
FORMAT = "I5"
UNIT = "N/A"
MISSING_CONSTANT = 99999
DESCRIPTION = "PP electron density"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "LMID"
DATA_TYPE = ASCII_INTEGER
START_BYTE = 306
BYTES = 5
FORMAT = "I5"
MISSING_CONSTANT = 99999
DESCRIPTION = "Common electronics
                SLT mid word"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "LLOW"
DATA_TYPE = ASCII_INTEGER
START_BYTE = 312
  
```

```

    BYTES = 5
    FORMAT = "I5"
    MISSING_CONSTANT = 99999
    DESCRIPTION = "Common electronics
                  SLT low word"
END_OBJECT = COLUMN

OBJECT = COLUMN
  NAME = "T-HK_CHANNEL1"
  DATA_TYPE = ASCII_REAL
  START_BYTE = 318
  BYTES = 8
  FORMAT = "F8.3"
  UNIT = "VOLT"
  MISSING_CONSTANT = 9999.999
  DESCRIPTION = "Voltage of temperature channel using
                regular HK measurement, for Foot -Y/TRM"
END_OBJECT = COLUMN

OBJECT = COLUMN
  NAME = "T-I1_CHANNEL1"
  DATA_TYPE = ASCII_REAL
  START_BYTE = 327
  BYTES = 8
  FORMAT = "F8.3"
  UNIT = "VOLT"
  MISSING_CONSTANT = 9999.999
  DESCRIPTION = "Intermediate voltage measured shortly after
                switching from temperature channel to reference
                channel 1, for Foot -Y/TRM"
END_OBJECT = COLUMN

OBJECT = COLUMN
  NAME = "T-R1_CHANNEL1"
  DATA_TYPE = ASCII_REAL
  START_BYTE = 336
  BYTES = 8
  FORMAT = "F8.3"
  UNIT = "VOLT"
  MISSING_CONSTANT = 9999.999
  DESCRIPTION = "Voltage of reference channel 1 = UCDP,
                for Foot -Y/TRM"
END_OBJECT = COLUMN

OBJECT = COLUMN
  NAME = "T-I2_CHANNEL1"
  DATA_TYPE = ASCII_REAL
  START_BYTE = 345
  BYTES = 8
  FORMAT = "F8.3"
  UNIT = "VOLT"
  MISSING_CONSTANT = 9999.999
  DESCRIPTION = "Intermediate voltage measured shortly after
  
```

```
switching from temperature channel to reference
channel 2, for Foot -Y/TRM"
END_OBJECT = COLUMN

OBJECT = COLUMN
  NAME = "T-R2_CHANNEL1"
  DATA_TYPE = ASCII_REAL
  START_BYTE = 354
  BYTES = 8
  FORMAT = "F8.3"
  UNIT = "VOLT"
  MISSING_CONSTANT = 9999.999
  DESCRIPTION = "Voltage of reference channel 2 = U + 28,
for Foot -Y/TRM"
END_OBJECT = COLUMN

OBJECT = COLUMN
  NAME = "T-HK_CHANNEL2"
  DATA_TYPE = ASCII_REAL
  START_BYTE = 363
  BYTES = 8
  FORMAT = "F8.3"
  UNIT = "VOLT"
  MISSING_CONSTANT = 9999.999
  DESCRIPTION = "Voltage of temperature channel using
regular HK measurement, for Foot -Y/ACC"
END_OBJECT = COLUMN

OBJECT = COLUMN
  NAME = "T-I1_CHANNEL2"
  DATA_TYPE = ASCII_REAL
  START_BYTE = 372
  BYTES = 8
  FORMAT = "F8.3"
  UNIT = "VOLT"
  MISSING_CONSTANT = 9999.999
  DESCRIPTION = "Intermediate voltage measured shortly after
switching from temperature channel to reference
channel 1, for Foot -Y/ACC"
END_OBJECT = COLUMN

OBJECT = COLUMN
  NAME = "T-R1_CHANNEL2"
  DATA_TYPE = ASCII_REAL
  START_BYTE = 381
  BYTES = 8
  FORMAT = "F8.3"
  UNIT = "VOLT"
  MISSING_CONSTANT = 9999.99
  DESCRIPTION = "voltage of reference channel 1 = UCDP,
for Foot -Y/ACC"
END_OBJECT = COLUMN
```

OBJECT = COLUMN  
NAME = "T-I2\_CHANNEL2"  
DATA\_TYPE = ASCII\_REAL  
START\_BYTE = 390  
BYTES = 8  
FORMAT = "F8.3"  
UNIT = "VOLT"  
MISSING\_CONSTANT = 9999.999  
DESCRIPTION = "Intermediate voltage measured shortly after  
switching from temperature channel to reference  
channel 2, for Foot -Y/ACC"

END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "T-R2\_CHANNEL2"  
DATA\_TYPE = ASCII\_REAL  
START\_BYTE = 399  
BYTES = 8  
FORMAT = "F8.3"  
UNIT = "VOLT"  
MISSING\_CONSTANT = 9999.999  
DESCRIPTION = "Voltage of reference channel 2 = U + 28,  
for Foot -Y/ACC"

END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "T-HK\_CHANNEL3"  
DATA\_TYPE = ASCII\_REAL  
START\_BYTE = 408  
BYTES = 8  
FORMAT = "F8.3"  
UNIT = "VOLT"  
MISSING\_CONSTANT = 9999.999  
DESCRIPTION = "Voltage of temperature channel using  
regular HK measurement, for Foot +X/TRM"

END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "T-I1\_CHANNEL3"  
DATA\_TYPE = ASCII\_REAL  
START\_BYTE = 417  
BYTES = 8  
FORMAT = "F8.3"  
UNIT = "VOLT"  
MISSING\_CONSTANT = 9999.999  
DESCRIPTION = "Intermediate voltage measured shortly after  
switching from temperature channel to reference  
from temperature channel to reference  
channel 1, for Foot +X/TRM"

END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "T-R1\_CHANNEL3"

```

DATA_TYPE           = ASCII_REAL
START_BYTE          = 426
BYTES               = 8
FORMAT              = "F8.3"
UNIT                = "VOLT"
MISSING_CONSTANT    = 9999.999
DESCRIPTION         = "Voltage of reference channel 1 = UCDP,
                      for Foot +X/TRM"
END_OBJECT          = COLUMN

OBJECT              = COLUMN
NAME                = "T-I2_CHANNEL3"
DATA_TYPE           = ASCII_REAL
START_BYTE          = 435
BYTES               = 8
FORMAT              = "F8.3"
UNIT                = "VOLT"
MISSING_CONSTANT    = 9999.999
DESCRIPTION         = "Intermediate voltage measured shortly after
                      switching from temperature channel to reference
                      channel 2, for Foot +X/TRM"
END_OBJECT          = COLUMN

OBJECT              = COLUMN
NAME                = "T-R2_CHANNEL3"
DATA_TYPE           = ASCII_REAL
START_BYTE          = 444
BYTES               = 8
FORMAT              = "F8.3"
UNIT                = "VOLT"
MISSING_CONSTANT    = 9999.999
DESCRIPTION         = "Voltage of reference channel 2 = U + 28,
                      for Foot +X/TRM"
END_OBJECT          = COLUMN

OBJECT              = COLUMN
NAME                = "T-HK_CHANNEL4"
DATA_TYPE           = ASCII_REAL
START_BYTE          = 453
BYTES               = 8
FORMAT              = "F8.3"
UNIT                = "VOLT"
MISSING_CONSTANT    = 9999.999
DESCRIPTION         = "Voltage of temperature channel using
                      regular HK measurement, for Foot +X/ACC"
END_OBJECT          = COLUMN

OBJECT              = COLUMN
NAME                = "T-I1_CHANNEL4"
DATA_TYPE           = ASCII_REAL
START_BYTE          = 462
BYTES               = 8
FORMAT              = "F8.3"
  
```

```
UNIT = "VOLT"
MISSING_CONSTANT = 9999.999
DESCRIPTION = "Intermediate voltage measured shortly after
              switching from temperature channel to reference
              channel 1, for Foot +X/ACC"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "T-R1_CHANNEL4"
DATA_TYPE = ASCII_REAL
START_BYTE = 471
BYTES = 8
FORMAT = "F8.3"
UNIT = "VOLT"
MISSING_CONSTANT = 9999.999
DESCRIPTION = "Voltage of reference channel 1 = UCDP,
              for Foot +X/ACC"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "T-I2_CHANNEL4"
DATA_TYPE = ASCII_REAL
START_BYTE = 480
BYTES = 8
FORMAT = "F8.3"
UNIT = "VOLT"
MISSING_CONSTANT = 9999.999
DESCRIPTION = "Intermediate voltage measured shortly after
              switching from temperature channel to reference
              channel 2, for Foot +X/ACC"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "T-R2_CHANNEL4"
DATA_TYPE = ASCII_REAL
START_BYTE = 489
BYTES = 8
FORMAT = "F8.3"
UNIT = "VOLT"
MISSING_CONSTANT = 9999.999
DESCRIPTION = "Voltage of reference channel 2 = U + 28,
              for Foot +X/ACC"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "T-HK_CHANNEL5"
DATA_TYPE = ASCII_REAL
START_BYTE = 498
BYTES = 8
FORMAT = "F8.3"
UNIT = "VOLT"
MISSING_CONSTANT = 9999.999
DESCRIPTION = "Voltage of temperature channel using
```



```
                                regular HK measurement, for Foot +Y/TRM"
END_OBJECT                      = COLUMN

OBJECT                          = COLUMN
  NAME                          = "T-I1_CHANNEL5"
  DATA_TYPE                     = ASCII_REAL
  START_BYTE                     = 507
  BYTES                          = 8
  FORMAT                         = "F8.3"
  UNIT                          = "VOLT"
  MISSING_CONSTANT               = 9999.999
  DESCRIPTION                    = "Intermediate voltage measured shortly after
                                switching from temperature channel to reference
                                channel 1, for Foot +Y/TRM"
END_OBJECT                      = COLUMN

OBJECT                          = COLUMN
  NAME                          = "T-R1_CHANNEL5"
  DATA_TYPE                     = ASCII_REAL
  START_BYTE                     = 516
  BYTES                          = 8
  FORMAT                         = "F8.3"
  UNIT                          = "VOLT"
  MISSING_CONSTANT               = 9999.999
  DESCRIPTION                    = "Voltage of reference channel 1 = UCDP,
                                for Foot +Y/TRM"
END_OBJECT                      = COLUMN

OBJECT                          = COLUMN
  NAME                          = "T-I2_CHANNEL5"
  DATA_TYPE                     = ASCII_REAL
  START_BYTE                     = 525
  BYTES                          = 8
  FORMAT                         = "F8.3"
  UNIT                          = "VOLT"
  MISSING_CONSTANT               = 9999.999
  DESCRIPTION                    = "Intermediate voltage measured shortly after
                                switching from temperature channel to reference
                                channel 2, for Foot +Y/TRM"
END_OBJECT                      = COLUMN

OBJECT                          = COLUMN
  NAME                          = "T-R2_CHANNEL5"
  DATA_TYPE                     = ASCII_REAL
  START_BYTE                     = 534
  BYTES                          = 8
  FORMAT                         = "F8.3"
  UNIT                          = "VOLT"
  MISSING_CONSTANT               = 9999.999
  DESCRIPTION                    = "Voltage of reference channel 2 = U + 28,
                                for Foot +Y/TRM"
END_OBJECT                      = COLUMN
```

```
OBJECT = COLUMN
  NAME = "T-HK_CHANNEL6"
  DATA_TYPE = ASCII_REAL
  START_BYTE = 543
  BYTES = 8
  FORMAT = "F8.3"
  UNIT = "VOLT"
  MISSING_CONSTANT = 9999.999
  DESCRIPTION = "Voltage of temperature channel using
                regular HK measurement, for Foot +Y/ACC"
END_OBJECT = COLUMN

OBJECT = COLUMN
  NAME = "T-I1_CHANNEL6"
  DATA_TYPE = ASCII_REAL
  START_BYTE = 552
  BYTES = 8
  FORMAT = "F8.3"
  UNIT = "VOLT"
  MISSING_CONSTANT = 9999.999
  DESCRIPTION = "Intermediate voltage measured shortly after
                switching from temperature channel to reference
                channel 1, for Foot +Y/ACC"
END_OBJECT = COLUMN

OBJECT = COLUMN
  NAME = "T-R1_CHANNEL6"
  DATA_TYPE = ASCII_REAL
  START_BYTE = 561
  BYTES = 8
  FORMAT = "F8.3"
  UNIT = "VOLT"
  MISSING_CONSTANT = 9999.999
  DESCRIPTION = "Voltage of reference channel 1 = UCDP,
                for Foot +Y/ACC"
END_OBJECT = COLUMN

OBJECT = COLUMN
  NAME = "T-I2_CHANNEL6"
  DATA_TYPE = ASCII_REAL
  START_BYTE = 570
  BYTES = 8
  FORMAT = "F8.3"
  UNIT = "VOLT"
  MISSING_CONSTANT = 9999.999
  DESCRIPTION = "Intermediate voltage measured shortly after
                switching from temperature channel to reference
                channel 2, for Foot +Y/ACC"
END_OBJECT = COLUMN

OBJECT = COLUMN
  NAME = "T-R2_CHANNEL6"
  DATA_TYPE = ASCII_REAL
```

```
START_BYTE           = 579
BYTES                = 8
FORMAT               = "F8.3"
UNIT                 = "VOLT"
MISSING_CONSTANT     = 9999.999
DESCRIPTION           = "Voltage of reference channel 2 = U + 28,
                        for Foot +Y/ACC"
END_OBJECT           = COLUMN

OBJECT               = COLUMN
NAME                 = "T-HK_CHANNEL7"
DATA_TYPE            = ASCII_REAL
START_BYTE           = 588
BYTES                = 8
FORMAT               = "F8.3"
UNIT                 = "VOLT"
MISSING_CONSTANT     = 9999.999
DESCRIPTION           = "Voltage of temperature channel using
                        regular HK measurement, for CASSE PCB
                        temperature"
END_OBJECT           = COLUMN

OBJECT               = COLUMN
NAME                 = "T-I1_CHANNEL7"
DATA_TYPE            = ASCII_REAL
START_BYTE           = 597
BYTES                = 8
FORMAT               = "F8.3"
UNIT                 = "VOLT"
MISSING_CONSTANT     = 9999.999
DESCRIPTION           = "Intermediate voltage measured shortly after
                        switching from temperature channel to reference
                        channel 1, for CASSE PCB temperature"
END_OBJECT           = COLUMN

OBJECT               = COLUMN
NAME                 = "T-R1_CHANNEL7"
DATA_TYPE            = ASCII_REAL
START_BYTE           = 606
BYTES                = 8
FORMAT               = "F8.3"
UNIT                 = "VOLT"
MISSING_CONSTANT     = 9999.999
DESCRIPTION           = "Voltage of reference channel 1 = UCDP,
                        for CASSE PCB temperature"
END_OBJECT           = COLUMN

OBJECT               = COLUMN
NAME                 = "T-I2_CHANNEL7"
DATA_TYPE            = ASCII_REAL
START_BYTE           = 615
BYTES                = 8
FORMAT               = "F8.3"
```

```
UNIT = "VOLT"
MISSING_CONSTANT = 9999.999
DESCRIPTION = "Intermediate voltage measured shortly after
switching from temperature channel to reference
channel 2, for CASSE PCB temperature"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "T-R2_CHANNEL7"
DATA_TYPE = ASCII_REAL
START_BYTE = 624
BYTES = 8
FORMAT = "F8.3"
UNIT = "VOLT"
MISSING_CONSTANT = 9999.999
DESCRIPTION = "Voltage of reference channel 2 = U + 28,
for CASSE PCB temperature"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "URAD-2"
DATA_TYPE = ASCII_REAL
START_BYTE = 633
BYTES = 8
FORMAT = "F8.3"
UNIT = "VOLT"
MISSING_CONSTANT = 9999.999
DESCRIPTION = "CASSE total dose (RadFET),
second measurement"
END_OBJECT = COLUMN
```

The SESAME housekeeping parameters are described by the following TABLE object.

```
OBJECT = FILE
RECORD_TYPE = FIXED_LENGTH
FILE_RECORDS =
^HK =
OBJECT = HK_TABLE
NAME = HK
INTERCHANGE_FORMAT = ASCII
ROWS = 1
COLUMNS = 35
ROW_BYTES = 302
^STRUCTURE = "SESAME_HK.FMT"
END_OBJECT = HK_TABLE
END_OBJECT = FILE
```

The structure of the receiver data TABLE object is described in the file SESAME\_HK.FMT.

The SESAME reading of Backup RAM Buffer are described by the following TABLE object.

```
OBJECT          = RBUF_TABLE
NAME            = RBUF
INTERCHANGE_FORMAT = ASCII
ROWS            = 1
COLUMNS        = 5
ROW_BYTES       = 221
^STRUCTURE      = "SESAME_RBUF.FMT"
END_OBJECT      = RBUF_TABLE
```

The structure of the receiver data TABLE object is described in the file SESAME\_RBUF.FMT.

```
/* FILE_CONTENTS = SESAME Read Backup RAM Buffer */
/* FILE_NAME = SESAME_RBUF.FMT */
/* REVISION_NOTE = K. Seidensticker, version 3, 2015-11-05 */
/* REVISION_NOTE = W. Schmidt, version 4, 2015-11-11 */

OBJECT = COLUMN
  NAME = "UTC"
  DATA_TYPE = TIME
  START_BYTE = 1
  BYTES = 23
  DESCRIPTION = "Measurement start time (UTC in PDS standard
    format YYYY-MM-DDThh:mm:ss.sss)"
END_OBJECT = COLUMN

OBJECT = COLUMN
  NAME = "SESAME_LOCAL_TIME"
  DATA_TYPE = ASCII_INTEGER
  START_BYTE = 25
  BYTES = 15
  FORMAT = "I15"
  DESCRIPTION = "Start time of measurement. SESAME local time
    (SLT) runs with a resolution of 1/32 seconds.
    SLT represents the least significant 32 bits
    of LOBT. The most significant 5 bits are in
    CDMS RSST (see SESAME Ready Message)"
END_OBJECT = COLUMN

OBJECT = COLUMN
  NAME = "RBUF_SUBSYS"
  DATA_TYPE = ASCII_INTEGER
  START_BYTE = 41
  BYTES = 8
  DESCRIPTION = "Unit subsystem address (echoed TC
    parameter, hex value 16#xxxx#)"
END_OBJECT = COLUMN

OBJECT = COLUMN
  NAME = "RBUF_OFFSET"
  DATA_TYPE = ASCII_INTEGER
  START_BYTE = 50
  BYTES = 8
  DESCRIPTION = "Offset in backup RAM buffer (echoed
    TC parameter, hex value 16#xxxx#)"
END_OBJECT = COLUMN

OBJECT = COLUMN
  NAME = "RBUF_RECORD"
  DATA_TYPE = CHARACTER
  START_BYTE = 60
  BYTES = 159
  FORMAT = "A159"
  DESCRIPTION = "Contents of backup RAM buffer record:
    64 bytes displayed as groups of 4 characters
```

```

                                (hex values) separated by blanks"
END_OBJECT                      = COLUMN
  
```

The SESAME Read Stored TC buffer data (to be stored into CASSE jobcard) are described by the following TABLE object.

```

OBJECT                          = RDJC_TABLE
  NAME                          = RDJC
  INTERCHANGE_FORMAT            = ASCII
  ROWS                           = 1
  COLUMNS                       = 4
  ROW_BYTES                      = 130
  ^STRUCTURE                    = "SESAME_RDJC.FMT"
END_OBJECT                      = RDJC_TABLE
  
```

The structure of the receiver data TABLE object is described in the file SESAME\_RDJC.FMT.

```

OBJECT                          = COLUMN
  NAME                          = "UTC"
  DATA_TYPE                    = TIME
  START_BYTE                    = 1
  BYTES                          = 23
  DESCRIPTION                    = "Measurement start time (UTC in PDS standard
                                format YYYY-MM-DDThh:mm:ss.sss)"
END_OBJECT                      = COLUMN

OBJECT                          = COLUMN
  NAME                          = "SESAME_LOCAL_TIME"
  DATA_TYPE                    = ASCII_INTEGER
  START_BYTE                    = 25
  BYTES                          = 15
  FORMAT                        = "I15"
  DESCRIPTION                    = "Start time of measurement. SESAME local time
                                (SLT) runs with a resolution of 1/32 seconds.
                                SLT represents the least significant 32 bits
                                of LOBT. The most significant 5 bits are in
                                CDMS RSST (see SESAME Ready Message)"
END_OBJECT                      = COLUMN

OBJECT                          = COLUMN
  NAME                          = "RDJC_OFFSET"
  DATA_TYPE                    = CHARACTER
  START_BYTE                    = 42
  BYTES                          = 4
  FORMAT                        = "A4"
  DESCRIPTION                    = "Offset in Stored TC Buffer (echoed
                                command parameter, hex value)"
END_OBJECT                      = COLUMN

OBJECT                          = COLUMN
  NAME                          = "RDJC_RECORD"
  DATA_TYPE                    = CHARACTER
  START_BYTE                    = 49
  BYTES                          = 79
  FORMAT                        = "A79"
  DESCRIPTION                    = "First 16 words of STC record:
                                16 words displayed as groups of 4 characters
                                (hex values) separated by blanks"
END_OBJECT                      = COLUMN
  
```

The SESAME first to tenth command word of CDMS RSST message are described by the following TABLE object.

```

OBJECT          = RMES_TABLE
  NAME          = RMES
  INTERCHANGE_FORMAT = ASCII
  ROWS          = 1
  COLUMNS      = 5
  ROW_BYTES     = 137
  ^STRUCTURE   = "SESAME_RMES.FMT"
END_OBJECT      = RMES_TABLE
  
```

The structure of the receiver data TABLE object is described in the file SESAME\_RMES.FMT-

```

/* FILE_CONTENTS      = SESAME Ready Message */
/* FILE_NAME          = SESAME_RMES.FMT */
/* REVISION_NOTE      = K. Seidensticker and W. Schmidt, */
/*                    = version 5, 2015-11-05 */

OBJECT          = COLUMN
  NAME          = "UTC"
  DATA_TYPE    = TIME
  START_BYTE    = 1
  BYTES         = 23
  DESCRIPTION   = "Measurement start time (UTC in PDS standard
                  = format YYYY-MM-DDThh:mm:ss.sss)"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
  NAME          = "SESAME_LOCAL_TIME"
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 25
  BYTES         = 15
  FORMAT        = "I15"
  DESCRIPTION   = "Start time of measurement. SESAME local time
                  = (SLT) runs with a resolution of 1/32 seconds.
                  = SLT represents the least significant 32 bits of
                  = LOBT. The most significant 5 bits are in
                  = CDMS RSST (see SESAME Ready Message)"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
  NAME          = "SESAME_SYS_MSG"
  DATA_TYPE    = CHARACTER
  START_BYTE    = 42
  BYTES         = 30
  FORMAT        = "A30"
  DESCRIPTION   = "SESAME ready message:
                  = SESAME Flight S/W - Ready"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
  NAME          = "SESAME_SW_VER"
  
```



```

DATA_TYPE           = CHARACTER
START_BYTE          = 75
BYTES               = 8
FORMAT              = "A8"
MISSING_CONSTANT    = "FM1      "
DESCRIPTION         = "SESAME flight software version,
                       8 characters, padded with trailing blanks,
                       e.g. 'FM3.00  ' ;
                       does not exist for software version FM1"
END_OBJECT          = COLUMN

OBJECT              = COLUMN
NAME                = "SESAME_RSST"
DATA_TYPE           = CHARACTER
START_BYTE          = 86
BYTES               = 49
FORMAT              = "A49"
DESCRIPTION         = "First to tenth command word of CDMS RSST
                       message (system status table); hex representation;
                       cf. CDMS specification (RO-LCD-SP-3101);
                       does not exist for software version FM1"
END_OBJECT          = COLUMN
  
```

### 4.3.3 Science level 3 data product design

Level 3 contains calibrated and corrected CASSE and PP time series and DIM tables. The level 3 products have PDS detached labels and combined detached labels. The SESAME subdirectory contains calibrated housekeeping (HK) and health-check data all with the appropriate time-stamp. The calibration is described in SES\_CAS\_CALIBRATION\_DESC.TXT, SES\_DIM\_CALIBRATION\_DESC.TXT and SES\_PP\_CALIBRATION\_DESC.TXT (DOCUMENT directory).

#### 4.3.3.1 File Characteristics Data Elements

PDS data product **labels** contain data element information that describes important attributes of the physical structure of a data product file. The PDS file characteristic data elements for SEAME science level 3 data are:

```

RECORD_TYPE
RECORD_BYTES
FILE_RECORDS
  
```

The RECORD\_TYPE data element identifies the record characteristics of the data product file. Physical records are always fixed-length. The RECORD\_BYTES data element identifies the number of bytes in each physical record in the data product file. The FILE\_RECORDS data element identifies the number of physical records in the file.

#### 4.3.3.2 Data Object Pointers Identification Data Elements

The SESAME data have combined detached labels. A single PDS detached data product label file is used to describe the contents of more than one data product file (the products belong to the same working session of a SESAME instrument). The combined detached label contains pointers to individual data products. The labels refer to FILE objects.

#### 4.3.3.3 Instrument and Detector Descriptive Data Elements

The following data identification elements provide additional information about the SESAME data product.

```

INSTRUMENT_HOST_NAME = "ROSETTA-LANDER"
  
```

```

INSTRUMENT_HOST_ID      = RL
INSTRUMENT_ID          = SESAME
INSTRUMENT_NAME        = "SURFACE ELECTRIC SOUNDING AND ACOUSTIC MONITORING
                        EXPERIMENT"
INSTRUMENT_TYPE        = {"ACOUSTIC SENSOR", "DUST IMPACT DETECTOR",
                          "PERMITTIVITY PROBE"}
  
```

#### 4.3.3.4 Data Object Definition

##### 4.3.3.4.1 CASSE Data object definition

The CASSE data are organized as tables with 24 columns containing 12 times and 12 channel values (accelerometers or transmitters): time1 channel1 time2 channel2 ... time12 channel12.

The association axis-channel is fixed and it is given in the label. The « Jobcards » and « sequence parameters » are kept in separated files (combined detached labels)

Example: CASSE sounding (1 label file pointing to 4 data files)

```

SES_FS3_CSN_0510040300.LBL      (label)
SES_FS3_CSN_0510040300_JOB.CTAB  (parameters of jobcard)
SES_FS3_CSN_0510040300_SEQP.TAB  (sequence parameters)
SES_FS3_CSN_0510040300_DATA.TAB  (DATA: ACC or TX)
SES_FS3_CSN_0510040300_TAFT.TAB  (foot temperatures)
  
```

The label contains the Start and Stop times as LOBT and UTC. The data files contain time in ms relative to the start time.

##### 4.3.3.4.1.1 CASSE Jobcard definition (level 3)

The jobcard is described by a TABLE object.

```

OBJECT          = JOBC_TABLE
NAME            = DATA
INTERCHANGE_FORMAT = ASCII
ROWS           =
COLUMNS        =
ROW_BYTES       =
^STRUCTURE      = "JOB CARD FM3.FMT"
END_OBJECT      = JOBC_TABLE
  
```

The structure of the TABLE object is defined in the file JOBCARD\_FM3.FMT.

```

OBJECT          = COLUMN
NAME            = "SESAME_SEQ_ID"
DATA_TYPE       = ASCII_INTEGER
START_BYTE      = 1
BYTES           = 6
FORMAT          = "I6"
UNIT            = "N/A"
DESCRIPTION     = "Sequence ID in the current data file"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
NAME            = "JOB_ID"
DATA_TYPE       = CHARACTER
  
```

START\_BYTE = 9  
BYTES = 2  
FORMAT = "A2"  
UNIT = "N/A"  
DESCRIPTION = "Jobcard identifier (hex value)"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "JOB\_VERSION"  
DATA\_TYPE = CHARACTER  
START\_BYTE = 14  
BYTES = 1  
FORMAT = "A1"  
UNIT = "N/A"  
DESCRIPTION = "The possible values are:  
0 for FM-1 and FM-2  
B for FM-3"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "NMEAS"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 17  
BYTES = 3  
FORMAT = "I3"  
UNIT = "N/A"  
DESCRIPTION = "Number of measurements (1 to 127)"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "STACK"  
DATA\_TYPE = CHARACTER  
START\_BYTE = 22  
BYTES = 3  
FORMAT = "A3"  
UNIT = "N/A"  
DESCRIPTION = "Indicates that the time series shall  
be stacked on board. The possible  
values are YES or NO."  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "SOUND\_FREQ"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 27  
BYTES = 5  
FORMAT = "I5"  
UNIT = "HERTZ"  
DESCRIPTION = "Nominal sounding frequency"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "SND\_DURATION"

```
DATA_TYPE = ASCII_REAL
START_BYTE = 33
BYTES = 9
FORMAT = "F9.1"
UNIT = "MILLISECOND"
MISSING_CONSTANT = 9999999.9
DESCRIPTION = "Sounding duration in sounding mode"
END_OBJECT = COLUMN
```

```
OBJECT = COLUMN
NAME = "TRIGGER_TIMEOUT"
DATA_TYPE = ASCII_INTEGER
START_BYTE = 43
BYTES = 5
FORMAT = "I5"
UNIT = "SECOND"
MISSING_CONSTANT = 99999
DESCRIPTION = "Time-out duration, after which listening stops
if no trigger signal occurred"
END_OBJECT = COLUMN
```

```
OBJECT = COLUMN
NAME = "SAMPLING_FREQ"
DATA_TYPE = ASCII_INTEGER
START_BYTE = 49
BYTES = 6
FORMAT = "I6"
UNIT = "HERTZ"
DESCRIPTION = "Sampling frequency per channel"
END_OBJECT = COLUMN
```

```
OBJECT = COLUMN
NAME = "TX_STATUS"
DATA_TYPE = CHARACTER
START_BYTE = 57
BYTES = 5
FORMAT = "A5"
UNIT = "N/A"
DESCRIPTION = "Selection of transmitters to be used in
Sounding Mode. If TX_cycle is set, after a
measurement the transmitter selection is
(cyclically) shifted by one position up to
yield the transmitters to be used for the next
measurement. If Tx_reverse is additionally set,
the selection of active transmitters is shifted
one position downwards instead.
Bit field represented as 5 characters, the rightmost
character corresponds to bit #0 and the leftmost to
bit #4.
Each character can be 1 (active sensor or cycle on or
reversed on) or 0 (sensor not used) and have the
following meaning:
bit 0: TRM -Y
```

bit 1: TRM +X  
bit 2: TRM +Y  
bit 3: TX\_cycle  
bit 4: TX\_reverse"

END\_OBJECT = COLUMN

OBJECT = COLUMN

NAME = "AGC"

DATA\_TYPE = CHARACTER

START\_BYTE = 65

BYTES = 2

FORMAT = "A2"

UNIT = "N/A"

DESCRIPTION = "Amplification gain selection (hex value)

Value to be written to the Amplifier Gain

Control register of CASSE electronics. Decimal value ranges from 0 (maximal gain) to 15 (minimal gain).

Note (a) the gain is not a monotone function of the AGC value, (b) the actually adjusted gain can deviate, if automatic gain setting (AGS) is enabled."

END\_OBJECT = COLUMN

OBJECT = COLUMN

NAME = "TRIGGER\_SRC"

DATA\_TYPE = CHARACTER

START\_BYTE = 70

BYTES = 12

FORMAT = "A12"

UNIT = "N/A"

DESCRIPTION = "Subset of active sensor channels used as trigger sources. Bit field represented as 12 characters, the rightmost character corresponds to bit #0 and the leftmost to bit #11. Each character can be 1 (active sensor used as a trigger source) or 0 (sensor not used as a trigger source) and have the following meaning:

bit 0: ACC -Y, x-axis  
bit 1: ACC -Y, y-axis  
bit 2: ACC -Y, z-axis  
bit 3: ACC +X, x-axis  
bit 4: ACC +X, y-axis  
bit 5: ACC +X, z-axis  
bit 6: ACC +Y, x-axis  
bit 7: ACC +Y, y-axis  
bit 8: ACC +Y, z-axis  
bit 9: TRM -Y  
bit 10: TRM +X  
bit 11: TRM +Y"

END\_OBJECT = COLUMN

OBJECT = COLUMN

NAME = "TRIGGER\_DELAY"

DATA\_TYPE = ASCII\_REAL

```
START_BYTE = 84
BYTES      = 9
FORMAT     = "F9.1"
UNIT       = "MILLISECOND"
DESCRIPTION = "Determines the time range before (negative
              value) or after (positive value) a trigger
              event, which shall be included in the time series.
              Absolute value of TrgDelay must be less or equal
              LIS_DURATION."
END_OBJECT = COLUMN

OBJECT     = COLUMN
NAME      = "TRIGGER_LEVEL_POS"
DATA_TYPE = ASCII_INTEGER
START_BYTE = 94
BYTES     = 4
FORMAT    = "I4"
UNIT      = "N/A"
DESCRIPTION = "Positive trigger level.
              Value to be written to the UTT hardware register,
              which fixes the upper (always positive) trigger
              threshold. Note that the actually adjusted value
              can be different, if automatic trigger level setting
              is enabled."
END_OBJECT = COLUMN

OBJECT     = COLUMN
NAME      = "TRIGGER_LEVEL_NEG"
DATA_TYPE = ASCII_INTEGER
START_BYTE = 99
BYTES     = 4
FORMAT    = "I4"
UNIT      = "N/A"
DESCRIPTION = "Negative trigger level.
              Value to be written to the LTT hardware register,
              which fixes the lower (always negative) trigger
              threshold. Note that the actually adjusted value
              can be different, if automatic trigger level setting
              is enabled."
END_OBJECT = COLUMN

OBJECT     = COLUMN
NAME      = "LIS_DURATION"
DATA_TYPE = ASCII_REAL
START_BYTE = 104
BYTES     = 9
FORMAT    = "F9.1"
UNIT      = "MILLISECOND"
DESCRIPTION = "Listening duration"
END_OBJECT = COLUMN

OBJECT     = COLUMN
NAME      = "RX_STATUS"
```

```
DATA_TYPE = CHARACTER
START_BYTE = 115
BYTES = 14
FORMAT = "A14"
UNIT = "N/A"
DESCRIPTION = "Selection of sensor channels to be used. If cycle
               is set, after a measurement the receiver selection
               is (cyclically) shifted by one position (in the same
               direction as the transmitters, as indicated in
               TX_STATUS. If the reversed flag is additionally set,
               the receiver cycling shall take place in the opposite
               direction as the transmitter cycling.
               Bit field represented as 15 characters, the rightmost
               character corresponds to bit #0 and the leftmost to
               bit #13.
               Each character can be 1 (active sensor or cycle on or
               reversed on) or 0 (sensor not used) and have the
               following meaning:
               bit 0: ACC -Y, x-axis
               bit 1: ACC -Y, y-axis
               bit 2: ACC -Y, z-axis
               bit 3: ACC +X, x-axis
               bit 4: ACC +X, y-axis
               bit 5: ACC +X, z-axis
               bit 6: ACC +Y, x-axis
               bit 7: ACC +Y, y-axis
               bit 8: ACC +Y, z-axis
               bit 9: TRM -Y
               bit 10: TRM +X
               bit 11: TRM +Y
               bit 12: cycle
               bit 13: reversed"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "G_GEN"
DATA_TYPE = ASCII_INTEGER
START_BYTE = 131
BYTES = 1
FORMAT = "I1"
UNIT = "N/A"
DESCRIPTION = "Values 1 or 0
               1: prepare data for automatic gain adjustment"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "G_COMP"
DATA_TYPE = ASCII_INTEGER
START_BYTE = 133
BYTES = 1
FORMAT = "I1"
UNIT = "N/A"
DESCRIPTION = "0: Do not calculate optimized gain"
```

1: Optimize for lower 1/3 of channels  
2: Optimize for lower 2/3 of channels  
3: Optimize for strongest channel"

END\_OBJECT = COLUMN

OBJECT = COLUMN

NAME = "TL\_GEN"

DATA\_TYPE = ASCII\_INTEGER

START\_BYTE = 135

BYTES = 1

FORMAT = "I1"

UNIT = "N/A"

DESCRIPTION = "Values 1 or 0

1: prepare data for automatic trigger level  
adjustment"

END\_OBJECT = COLUMN

OBJECT = COLUMN

NAME = "TL\_COMP"

DATA\_TYPE = ASCII\_INTEGER

START\_BYTE = 137

BYTES = 1

FORMAT = "I1"

UNIT = "N/A"

DESCRIPTION = "Values 1 or 0

1: adjust optimized trigger levels"

END\_OBJECT = COLUMN

OBJECT = COLUMN

NAME = "STATS"

DATA\_TYPE = ASCII\_INTEGER

START\_BYTE = 139

BYTES = 1

FORMAT = "I1"

UNIT = "N/A"

DESCRIPTION = "Values 1 or 0

1: include channels statistics for each  
measurement"

END\_OBJECT = COLUMN

OBJECT = COLUMN

NAME = "SKIP\_TS"

DATA\_TYPE = ASCII\_INTEGER

START\_BYTE = 141

BYTES = 1

FORMAT = "I1"

UNIT = "N/A"

DESCRIPTION = "Values 1 or 0

If 1 time series not included into telemetry  
(ignored in Stacking Mode)"

END\_OBJECT = COLUMN

OBJECT = COLUMN



NAME = "G\_TAR\_VAL"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 143  
BYTES = 3  
FORMAT = "I3"  
UNIT = "N/A"  
DESCRIPTION = "Target value for automatic gain adjustment.  
Linearized ADC units in the range 1 to 255.  
In combination with the value of G\_COMP,  
gain is adjusted such that the absolute  
values of the samples of 1/3, 2/3 or all  
channels are close to, but below, G\_TAR\_VAL."  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "TL\_FACTOR"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 147  
BYTES = 4  
FORMAT = I4  
UNIT = "N/A"  
DESCRIPTION = "Factor for calculating the trigger levels from  
10 to 2550%.  
Distance of trigger level from mean of time  
series (of selected trigger channels) relative  
to the distance between mean and the extreme  
sample values; TL\_FACTOR equals 10 (100 %)  
means that trigger level are set equal to the  
maximum deviation from mean during the  
pre-measurement.  
A TLFactor value less than or equal 10 would  
have caused a trigger signal during the  
pre-measurement. For each sensor channel  
marked as trigger channel, flight software  
calculates preliminary trigger levels based on  
statistical values (Max, Min, Mean) of a  
pre-measurement with  
$$\text{trglevneg} = (\text{Min}-\text{Mean}) * \text{TLFactor} / 10 + \text{Mean}$$
$$\text{trglevpos} = (\text{Max}-\text{Mean}) * \text{TLFactor} / 10 + \text{Mean}$$
The smallest value of the trglevneg obtained  
this way is adjusted as negative trigger level  
(TrgLevNeg), and the highest trglevpos as  
positive trigger level (TrgLevPos), possible  
after correcting different gain settings during  
the pre-measurement and the Trigger Mode  
measurement."  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "AMP\_SETUP"  
DATA\_TYPE = ASCII\_REAL  
START\_BYTE = 152  
BYTES = 4

FORMAT = "F4.1"  
UNIT = "SECOND"  
DESCRIPTION = "Amplifier setup time in sounding mode.  
It represents the Duration after start  
of time series recording used for amplifier  
setup (to yield constant base lines). A value  
of 1 s should normally be used, because  
it enables the correct identification of sensor  
channels for all possible sampling frequencies  
(no wrap-around of FIFO buffer)."

END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "FIFO\_LAG"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 157  
BYTES = 4  
FORMAT = I4  
UNIT = "N/A"  
DESCRIPTION = "Optional corrective offset of the address of  
the first sample to be transferred.  
Range from -127 to 127"

END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "FOOT\_TEMP"  
DATA\_TYPE = CHARACTER  
START\_BYTE = 163  
BYTES = 7  
FORMAT = "A7"  
UNIT = "N/A"  
DESCRIPTION = "Active foot temperature channels.  
Bit field represented as 7 characters, the  
rightmost character corresponds to bit #0  
and the leftmost to bit #6.  
The Temperature and Radiation Dose Data Block  
will be generated by flight software, if at least  
one foot temperature channel is selected in  
FOOT\_TEMP. It will additionally be included at  
the end of a measuring sequence, if the  
additional 'after job temperature' flag is set.  
Each character can be 1 (channel selected) or  
0 (channel not selected) and have the  
following meaning:  
bit 0: Temperature -Y, TRM  
bit 1: Temperature -Y, ACC  
bit 2: Temperature +X, TRM  
bit 3: Temperature +X, ACC  
bit 4: Temperature +Y, TRM  
bit 5: Temperature +Y, ACC  
bit 6: Additional after job temperatures"

END\_OBJECT = COLUMN

```

OBJECT          = COLUMN
  NAME          = "ADD_DELAY"
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 172
  BYTES         = 3
  UNIT          = "SECOND"
  FORMAT        = I3
  DESCRIPTION   = "Additional delay between measurements of
                  a measurement sequence"
END_OBJECT      = COLUMN
  
```

#### 4.3.3.4.1.2 CASSE Sequence Parameters in burst mode definition (level3)

The sequence parameters are described by a TABLE object.

```

OBJECT          = SEQ_PARAM_BURST
  NAME          = SEQ_PARAM_BURST3
  INTERCHANGE_FORMAT = ASCII
  ROWS          =
  COLUMNS      =
  ROW_BYTES     =
  ^STRUCTURE    = "SEQ_PARAM_BURST3.FMT"
END_OBJECT      = SEQ_PARAM_BURST
  
```

The structure of the Sequence parameters TABLE object is defined in the file SEQ\_PARAM\_BURST3.FMT.

```

OBJECT          = COLUMN
  NAME          = "SESAME_SEQ_ID"
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 1
  BYTES         = 6
  UNIT          = "N/A"
  FORMAT        = "I6"
  DESCRIPTION   = "Sequence ID in the current data file"
END_OBJECT      = COLUMN
  
```

```

OBJECT          = COLUMN
  NAME          = "MEAS_ID"
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 8
  BYTES         = 6
  FORMAT        = "I6"
  UNIT          = "N/A"
  DESCRIPTION   = "Measurement ID in the current sequence"
END_OBJECT      = COLUMN
  
```

```

OBJECT          = COLUMN
  NAME          = "UTC"
  DATA_TYPE    = TIME
  START_BYTE    = 15
  
```

```
    BYTES = 23
    DESCRIPTION = "Measurement start time (UTC in PDS standard
                  format YYYY-MM-DDThh:mm:ss.sss)"
END_OBJECT = COLUMN

OBJECT = COLUMN
    NAME = "SESAME_LOCAL_TIME_SEQ"
    DATA_TYPE = ASCII_INTEGER
    START_BYTE = 39
    BYTES = 15
    FORMAT = "I15"
    DESCRIPTION = "Start time of measurement. SESAME local time
                  (SLT) runs with a resolution of 1/32 seconds.
                  SLT represents the least significant 32 bits of
                  LOBT. The most significant 5 bits are in
                  CDMS RSST (see SESAME Ready Message)"
END_OBJECT = COLUMN

OBJECT = COLUMN
    NAME = "FREQUENCY_DIVIDER"
    DATA_TYPE = ASCII_INTEGER
    START_BYTE = 55
    BYTES = 3
    FORMAT = "I3"
    UNIT = "N/A"
    DESCRIPTION = "Adjusted transmitter frequency register value"
END_OBJECT = COLUMN

OBJECT = COLUMN
    NAME = "FREQUENCY_INCREMENT"
    DATA_TYPE = ASCII_INTEGER
    START_BYTE = 59
    BYTES = 5
    FORMAT = "I5"
    UNIT = "N/A"
    DESCRIPTION = "Adjusted sampling rate registers value"
END_OBJECT = COLUMN

OBJECT = COLUMN
    NAME = "CHANNELS"
    DATA_TYPE = ASCII_INTEGER
    START_BYTE = 65
    BYTES = 3
    FORMAT = "I3"
    UNIT = "N/A"
    DESCRIPTION = "Number of sensor channels minus one"
END_OBJECT = COLUMN

OBJECT = COLUMN
    NAME = "ADJ_SOUND_FREQ"
    DATA_TYPE = ASCII_INTEGER
    START_BYTE = 69
    BYTES = 5
```

```
FORMAT          = "I5"
UNIT            = "HERTZ"
DESCRIPTION     = "Transmitter frequency.
                  Equals zero in Listening mode"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
NAME           = "ADJ_SAMPLING_FREQ"
DATA_TYPE      = ASCII_INTEGER
START_BYTE     = 75
BYTES          = 10
FORMAT        = "I10"
UNIT          = "HERTZ"
DESCRIPTION   = "Sampling frequency per sensor channel"
END_OBJECT    = COLUMN

OBJECT          = COLUMN
NAME           = "SESAME_LOCAL_TIME"
DATA_TYPE      = ASCII_INTEGER
START_BYTE     = 86
BYTES          = 15
FORMAT        = "I15"
DESCRIPTION   = "Start time of measurement. SESAME local time
                  (SLT) runs with a resolution of 1/32 seconds.
                  SLT represents the least significant 32 bits of
                  LOBT. The most significant 5 bits are in
                  CDMS RSST (see SESAME Ready Message)"
END_OBJECT    = COLUMN

OBJECT          = COLUMN
NAME           = "TOTAL_MEAS_LENGTH"
DATA_TYPE      = CHARACTER
START_BYTE     = 103
BYTES          = 8
FORMAT        = "A8"
UNIT          = "N/A"
DESCRIPTION   = "FIFO RAM address when recording stopped
                  4 bytes, hexadecimal representation"
END_OBJECT    = COLUMN

OBJECT          = COLUMN
NAME           = "TEMP_FOOT-Y_TRM"
DATA_TYPE      = ASCII_REAL
START_BYTE     = 113
BYTES          = 6
FORMAT        = "F6.2"
UNIT          = "KELVIN"
DESCRIPTION   = "Foot temperature before measurement"
END_OBJECT    = COLUMN

OBJECT          = COLUMN
NAME           = "TEMP_FOOT-Y_ACC"
DATA_TYPE      = ASCII_REAL
```

```

START_BYTE      = 120
BYTES           = 6
FORMAT          = "F6.2"
UNIT            = "KELVIN"
DESCRIPTION     = "Foot temperature before measurement"
END_OBJECT      = COLUMN
  
```

```

OBJECT          = COLUMN
NAME            = "TEMP_FOOT+X_TRM"
DATA_TYPE       = ASCII_REAL
START_BYTE      = 127
BYTES           = 6
FORMAT          = "F6.2"
UNIT            = "KELVIN"
DESCRIPTION     = "Foot temperature before measurement"
END_OBJECT      = COLUMN
  
```

```

OBJECT          = COLUMN
NAME            = "TEMP_FOOT+X_ACC"
DATA_TYPE       = ASCII_REAL
START_BYTE      = 134
BYTES           = 6
FORMAT          = "F6.2"
UNIT            = "KELVIN"
DESCRIPTION     = "Foot temperature before measurement"
END_OBJECT      = COLUMN
  
```

```

OBJECT          = COLUMN
NAME            = "TEMP_FOOT+Y_TRM"
DATA_TYPE       = ASCII_REAL
START_BYTE      = 141
BYTES           = 6
FORMAT          = "F6.2"
UNIT            = "KELVIN"
DESCRIPTION     = "Foot temperature before measurement"
END_OBJECT      = COLUMN
  
```

```

OBJECT          = COLUMN
NAME            = "TEMP_FOOT+Y_ACC"
DATA_TYPE       = ASCII_REAL
START_BYTE      = 148
BYTES           = 6
FORMAT          = "F6.2"
UNIT            = "KELVIN"
DESCRIPTION     = "Foot temperature before measurement"
END_OBJECT      = COLUMN
  
```

#### 4.3.3.4.1.3 CASSE Sequence Parameters in trigger mode definition (level3)

The sequence parameters are described by a TABLE object.

```

OBJECT          = SEQ_PARAM_TRIG
NAME            = SEQ_PARAM_BURST3
  
```

```
INTERCHANGE_FORMAT = ASCII
ROWS =
COLUMNS =
ROW_BYTES =
^STRUCTURE = "SEQ_PARAM_TRIG3.FMT"
END_OBJECT = SEQ_PARAM_TRIG
```

The structure of the Sequence parameters TABLE object for FM2 is defined in the file SEQ\_PARAM\_TRIG3.FMT.

```
OBJECT = COLUMN
NAME = "SESAME_SEQ_ID"
DATA_TYPE = ASCII_INTEGER
START_BYTE = 1
BYTES = 6
UNIT = "N/A"
FORMAT = "I6"
DESCRIPTION = "Sequence ID in the current data file"
END_OBJECT = COLUMN
```

```
OBJECT = COLUMN
NAME = "MEAS_ID"
DATA_TYPE = ASCII_INTEGER
START_BYTE = 8
BYTES = 6
FORMAT = "I6"
UNIT = "N/A"
DESCRIPTION = "Measurement index, i.e. the number
of the measurement in the file.
Starts from 1."
END_OBJECT = COLUMN
```

```
OBJECT = COLUMN
NAME = "UTC"
DATA_TYPE = TIME
START_BYTE = 15
BYTES = 23
DESCRIPTION = "This column represents the UTC Time
for start of the sequence"
END_OBJECT = COLUMN
```

```
OBJECT = COLUMN
NAME = "SESAME_LOCAL_TIME"
DATA_TYPE = ASCII_INTEGER
START_BYTE = 39
BYTES = 15
FORMAT = "I15"
DESCRIPTION = "Start time of measurement. SESAME local time
(SLT) runs with a resolution of 1/32 seconds.
SLT represents the least significant 32 bits of
LOBT. The most significant 5 bits are in
CDMS RSST (see SESAME Ready Message)"
END_OBJECT = COLUMN
```

OBJECT = COLUMN  
NAME = "ERROR\_INIT"  
DATA\_TYPE = CHARACTER  
START\_BYTE = 56  
BYTES = 4  
FORMAT = "A4"  
DESCRIPTION = "Error status after initialisation  
in hexadecimal format (2 bytes).  
  
Possible values:  
0001 EB\_FREQ Invalid frequency increment (adjustment of sampling  
frequency); default (= 1312) used.  
0002 EB\_DIVRAT Invalid frequency divider (adjustment of sounding  
frequency); default (= 1) used.  
0004 EB\_CDPD\_ADC Error during temperature A/D conversion.  
4008 EB\_NCHAN Fatal: Invalid number of sensor channels  
4010 EB\_TIMEO Fatal: Time-out during triggered mode.  
4020 EB\_NOSTRT Fatal: Measurement start condition not fulfilled.  
8040 EB\_RAMOVR Fatal: Allocated SESAME SRAM space exhausted.  
4000 EB\_FATAL\_MES Fatal error or time-out; current measurement  
will be aborted.  
Columns are filled by missing\_constant if the last case occurs (4000),  
for the concerned measurement"

END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "FREQUENCY\_DIVIDER"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 62  
BYTES = 3  
FORMAT = "I3"  
UNIT = "N/A"  
DESCRIPTION = "Adjusted transmitter frequency register value"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "FREQUENCY\_INCREMENT"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 66  
BYTES = 5  
FORMAT = "I5"  
UNIT = "N/A"  
DESCRIPTION = "Adjusted sampling rate registers value"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "CHANNELS"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 72  
BYTES = 3  
FORMAT = "I3"  
UNIT = "N/A"  
DESCRIPTION = "Number of sensor channels minus one"



END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "TRIGGER\_STATUS"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 76  
BYTES = 4  
FORMAT = "I4"  
UNIT = "N/A"  
MISSING\_CONSTANT = 9999  
DESCRIPTION = "Contents of Trigger Status Register at  
time of trigger"

END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "TIME\_BURST\_ON"  
DATA\_TYPE = CHARACTER  
START\_BYTE = 82  
BYTES = 15  
FORMAT = "A15"  
MISSING\_CONSTANT = 9999999999999999  
DESCRIPTION = "SESAME Local Time at start of recording  
of measurement represented as :  
Reset number (integer starting at 1) / seconds  
The time resolution is 0.03125 s"

END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "TIME\_TRIGGER"  
DATA\_TYPE = CHARACTER  
START\_BYTE = 100  
BYTES = 15  
FORMAT = "A15"  
MISSING\_CONSTANT = 9999999999999999  
DESCRIPTION = "SESAME Local Time when trigger occurred  
represented as :  
Reset number (integer starting at 1) / seconds  
The time resolution is 0.03125 s"

END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "TIME\_BURST\_OFF"  
DATA\_TYPE = CHARACTER  
START\_BYTE = 118  
BYTES = 15  
FORMAT = "A15"  
MISSING\_CONSTANT = 9999999999999999  
DESCRIPTION = "SESAME Local Time at stop of recording  
represented as :  
Reset number (integer starting at 1) / seconds  
The time resolution is 0.03125 s"

END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "FIFO\_TRIGGER"  
DATA\_TYPE = CHARACTER  
START\_BYTE = 136  
BYTES = 8  
FORMAT = "A8"  
MISSING\_CONSTANT = 99999999  
DESCRIPTION = "FIFO RAM address when trigger occurred  
in hexadecimal format (4 bytes)"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "FIFO\_BURST\_OFF"  
DATA\_TYPE = CHARACTER  
START\_BYTE = 147  
BYTES = 8  
FORMAT = "A8"  
MISSING\_CONSTANT = 99999999  
DESCRIPTION = "FIFO RAM address when recording stopped  
in hexadecimal format (4 bytes)"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "FIFO\_FIRST\_DAT"  
DATA\_TYPE = CHARACTER  
START\_BYTE = 158  
BYTES = 8  
FORMAT = "A8"  
MISSING\_CONSTANT = 99999999  
DESCRIPTION = "FIFO RAM address of very first channel data  
in hexadecimal format (4 bytes)"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "TEMP\_FOOT-Y\_TRM"  
DATA\_TYPE = ASCII\_REAL  
START\_BYTE = 168  
BYTES = 6  
FORMAT = "F6.2"  
UNIT = "KELVIN"  
DESCRIPTION = "Foot temperature before measurement"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "TEMP\_FOOT-Y\_ACC"  
DATA\_TYPE = ASCII\_REAL  
START\_BYTE = 175  
BYTES = 6  
FORMAT = "F6.2"  
UNIT = "KELVIN"  
DESCRIPTION = "Foot temperature before measurement"  
END\_OBJECT = COLUMN

```
OBJECT          = COLUMN
  NAME          = "TEMP_FOOT+X_TRM"
  DATA_TYPE    = ASCII_REAL
  START_BYTE    = 182
  BYTES         = 6
  FORMAT        = "F6.2"
  UNIT          = "KELVIN"
  DESCRIPTION   = "Foot temperature before measurement"
END_OBJECT      = COLUMN
```

```
OBJECT          = COLUMN
  NAME          = "TEMP_FOOT+X_ACC"
  DATA_TYPE    = ASCII_REAL
  START_BYTE    = 189
  BYTES         = 6
  FORMAT        = "F6.2"
  UNIT          = "KELVIN"
  DESCRIPTION   = "Foot temperature before measurement"
END_OBJECT      = COLUMN
```

```
OBJECT          = COLUMN
  NAME          = "TEMP_FOOT+Y_TRM"
  DATA_TYPE    = ASCII_REAL
  START_BYTE    = 196
  BYTES         = 6
  FORMAT        = "F6.2"
  UNIT          = "KELVIN"
  DESCRIPTION   = "Foot temperature before measurement"
END_OBJECT      = COLUMN
```

```
OBJECT          = COLUMN
  NAME          = "TEMP_FOOT+Y_ACC"
  DATA_TYPE    = ASCII_REAL
  START_BYTE    = 203
  BYTES         = 6
  FORMAT        = "F6.2"
  UNIT          = "KELVIN"
  DESCRIPTION   = "Foot temperature before measurement"
END_OBJECT      = COLUMN
```

The structure of the Sequence parameters TABLE object for FM3 is defined in the file SEQ\_PARAM\_TRIG3\_FM3.FMT.

```
OBJECT          = COLUMN
  NAME          = "SESAME_SEQ_ID"
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 1
  BYTES         = 6
  FORMAT        = "I6"
  UNIT          = "N/A"
  DESCRIPTION   = "Sequence ID in the current data file"
END_OBJECT      = COLUMN
```

```
OBJECT          = COLUMN
  NAME          = "MEAS_ID"
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 8
  BYTES         = 6
  FORMAT        = "I6"
  UNIT          = "N/A"
  DESCRIPTION   = "Measurement ID in the current sequence"
END_OBJECT

OBJECT          = COLUMN
  NAME          = "UTC"
  DATA_TYPE    = TIME
  START_BYTE    = 15
  BYTES         = 23
  DESCRIPTION   = "Measurement start time (UTC in PDS standard
                  format YYYY-MM-DDThh:mm:ss.sss)"
END_OBJECT

OBJECT          = COLUMN
  NAME          = "SESAME_LOCAL_TIME"
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 39
  BYTES         = 15
  FORMAT        = "I15"
  DESCRIPTION   = "Start time of measurement. SESAME local time
                  (SLT) runs with a resolution of 1/32 seconds.
                  SLT represents the least significant 32 bits of
                  LOBT. The most significant 5 bits are in
                  CDMS RSST (see SESAME Ready Message)"
END_OBJECT

OBJECT          = COLUMN
  NAME          = "FREQUENCY_DIVIDER"
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 55
  BYTES         = 3
  FORMAT        = "I3"
  UNIT          = "N/A"
  DESCRIPTION   = "Value of transmitter frequency control register"
END_OBJECT

OBJECT          = COLUMN
  NAME          = "FREQUENCY_INCREMENT"
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 59
  BYTES         = 5
  FORMAT        = "I5"
  UNIT          = "N/A"
  DESCRIPTION   = "Value of sampling rate control registers"
END_OBJECT

OBJECT          = COLUMN
```

```
NAME = "CHANNELS"
DATA_TYPE = ASCII_INTEGER
START_BYTE = 65
BYTES = 3
FORMAT = "I3"
UNIT = "N/A"
DESCRIPTION = "Number of sensor channels, derived from SLTLA word
              (sensor lookup table length and address register)"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "AGC"
DATA_TYPE = ASCII_REAL
START_BYTE = 69
BYTES = 6
FORMAT = "F6.2"
UNIT = "N/A"
DESCRIPTION = "Nominal amplifier gain; calculated by
              multiplying the gains of the active
              amplification stages indicated by the
              control register settings. An active
              amplifier stage is signified by the
              corresponding bit set to 0.
              Bits are counted from right to left
              Bit 1 nominal gain factor: 3.13
              Bit 2 nominal gain factor: 2.13
              Bit 3 nominal gain factor: 4.55
              Bit 4 nominal gain factor: 5.55
              Bit pattern 1010 represents a nominal
              gain of 5.55 * 2.13 = 11.82"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "POWER_SETTING"
DATA_TYPE = CHARACTER
START_BYTE = 77
BYTES = 8
FORMAT = "A8"
UNIT = "N/A"
DESCRIPTION = "Power register setting /mode
              This is a character string where each
              character represents one bit.
              Bits 0 to 3: value of power control register
              Bits 4 to 7 = 0: power set during measurement initialization
              Bits 4 to 7 = 1: power set by previous CAS_PWRSW command "
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "TRIGGER_STATUS"
DATA_TYPE = CHARACTER
START_BYTE = 88
BYTES = 12
FORMAT = "A12"
```

---

UNIT = "N/A"

DESCRIPTION = "This is a Bit Pattern indicating which of the selected trigger channels triggered the recording bit field represented as 12 characters, the rightmost character corresponds to bit #0 and the leftmost to bit #11. Each character can be 1 (active sensor used as a trigger source) or 0 (sensor not used as a trigger source) and have the following meaning.  
bit 0: ACC -Y, x-axis  
bit 1: ACC -Y, y-axis  
bit 2: ACC -Y, z-axis  
bit 3: ACC +X, x-axis  
bit 4: ACC +X, y-axis  
bit 5: ACC +X, z-axis  
bit 6: ACC +Y, x-axis  
bit 7: ACC +Y, y-axis  
bit 8: ACC +Y, z-axis  
bit 9: TRM -Y  
bit 10: TRM +X  
bit 11: TRM +Y"

END\_OBJECT = COLUMN

OBJECT = COLUMN

NAME = "TIME\_BURST\_ON"

DATA\_TYPE = ASCII\_INTEGER

START\_BYTE = 102

BYTES = 10

UNIT = "N/A"

FORMAT = "I10"

DESCRIPTION = "SESAME High Resolution Time at start of recording with a resolution of 1/1024 s"

END\_OBJECT = COLUMN

OBJECT = COLUMN

NAME = "TIME\_TRIGGER"

DATA\_TYPE = ASCII\_INTEGER

START\_BYTE = 113

BYTES = 10

FORMAT = "I10"

UNIT = "N/A"

DESCRIPTION = "SESAME High Resolution Time when trigger event occurred with a resolution of 1/1024 s"

END\_OBJECT = COLUMN

OBJECT = COLUMN

NAME = "TIME\_BURST\_OFF"

DATA\_TYPE = ASCII\_INTEGER

START\_BYTE = 124

BYTES = 10

UNIT = "N/A"

FORMAT = "I10"

DESCRIPTION = "SESAME High Resolution Time when recording

was stopped with a resolution of 1/1024 s"

END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "FIFO\_TRIGGER"  
DATA\_TYPE = CHARACTER  
START\_BYTE = 136  
BYTES = 8  
FORMAT = "A8"  
DESCRIPTION = "FIFO RAM address when trigger occurred  
(hex value, 4 bytes)"

END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "FIFO\_BURST\_OFF"  
DATA\_TYPE = CHARACTER  
START\_BYTE = 147  
BYTES = 8  
UNIT = "N/A"  
FORMAT = "A8"  
DESCRIPTION = "FIFO RAM address when recording stopped  
(hex value, 4 bytes)"

END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "FIFO\_FIRST\_DAT"  
DATA\_TYPE = CHARACTER  
START\_BYTE = 158  
BYTES = 8  
UNIT = "N/A"  
FORMAT = "A8"  
DESCRIPTION = "FIFO RAM address of very first channel  
data (hex value, 4 bytes)"

END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "NSAMP"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 168  
BYTES = 10  
FORMAT = "I10"  
UNIT = "N/A"  
DESCRIPTION = "Number of samples per channel in telemetry"

END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "TEMP\_FOOT-Y\_TRM"  
DATA\_TYPE = ASCII\_REAL  
START\_BYTE = 179  
BYTES = 6  
FORMAT = "F6.2"  
UNIT = "KELVIN"  
DESCRIPTION = "Sensor temperature before measurement"

```
END_OBJECT          = COLUMN

OBJECT              = COLUMN
  NAME              = "TEMP_FOOT-Y_ACC"
  DATA_TYPE        = ASCII_REAL
  START_BYTE        = 186
  BYTES             = 6
  FORMAT            = "F6.2"
  UNIT              = "KELVIN"
  DESCRIPTION       = "Sensor temperature before measurement"
END_OBJECT          = COLUMN

OBJECT              = COLUMN
  NAME              = "TEMP_FOOT+X_TRM"
  DATA_TYPE        = ASCII_REAL
  START_BYTE        = 193
  BYTES             = 6
  FORMAT            = "F6.2"
  UNIT              = "KELVIN"
  DESCRIPTION       = "Sensor temperature before measurement"
END_OBJECT          = COLUMN

OBJECT              = COLUMN
  NAME              = "TEMP_FOOT+X_ACC"
  DATA_TYPE        = ASCII_REAL
  START_BYTE        = 200
  BYTES             = 6
  FORMAT            = "F6.2"
  UNIT              = "KELVIN"
  DESCRIPTION       = "Sensor temperature before measurement"
END_OBJECT          = COLUMN

OBJECT              = COLUMN
  NAME              = "TEMP_FOOT+Y_TRM"
  DATA_TYPE        = ASCII_REAL
  START_BYTE        = 207
  BYTES             = 6
  FORMAT            = "F6.2"
  UNIT              = "KELVIN"
  DESCRIPTION       = "Sensor temperature before measurement"
END_OBJECT          = COLUMN

OBJECT              = COLUMN
  NAME              = "TEMP_FOOT+Y_ACC"
  DATA_TYPE        = ASCII_REAL
  START_BYTE        = 214
  BYTES             = 6
  FORMAT            = "F6.2"
  UNIT              = "KELVIN"
  DESCRIPTION       = "Sensor temperature before measurement"
END_OBJECT          = COLUMN

OBJECT              = COLUMN
```



```

NAME           = "CASSE_PCB_TEMP"
DATA_TYPE      = ASCII_REAL
START_BYTE     = 221
BYTES         = 6
FORMAT        = "F6.2"
UNIT          = "KELVIN"
DESCRIPTION    = "CASSE PCB temperature"
END_OBJECT    = COLUMN
  
```

```

OBJECT        = COLUMN
NAME         = "RADFET_VOLTAGE"
DATA_TYPE    = ASCII_REAL
START_BYTE   = 228
BYTES       = 6
FORMAT      = "F6.3"
UNIT       = "MILLIVOLT"
DESCRIPTION = "RadFET voltage (0.002 V/mV)"
END_OBJECT  = COLUMN
  
```

#### 4.3.3.4.1.4 CASSE Data definition

The data produced in sounding or listening modes are described by the following TABLE object.

```

OBJECT        = DATA
NAME         = DATA
INTERCHANGE_FORMAT = ASCII
ROWS         =
COLUMNS     =
ROW_BYTES    =
^STRUCTURE   = "DATA3.FMT"
END_OBJECT    = ACC
  
```

The format of the table object for CASSE sounding and listening modes is described in the file DATA3.FMT.

```

OBJECT        = COLUMN
NAME         = "SESAME_SEQ_ID"
DATA_TYPE    = ASCII_INTEGER
START_BYTE   = 1
BYTES       = 6
UNIT       = "N/A"
FORMAT      = "I6"
DESCRIPTION  = "Sequence ID in the current data file"
END_OBJECT    = COLUMN
  
```

```

OBJECT        = COLUMN
NAME         = "MEAS_ID"
DATA_TYPE    = ASCII_INTEGER
START_BYTE   = 8
BYTES       = 6
FORMAT      = "I6"
UNIT       = "N/A"
DESCRIPTION  = "Measurement ID in the current sequence"
  
```

```
END_OBJECT          = COLUMN

OBJECT              = COLUMN
  NAME              = "RELATIVE_TIME_1"
  DATA_TYPE        = ASCII_REAL
  START_BYTE        = 15
  BYTES             = 10
  UNIT              = "MILLISECOND"
  FORMAT            = "F10.3"
  MISSING_CONSTANT  = 99999.999
  DESCRIPTION       = "Channel 1 time relative to
                       start time of the measurement"
END_OBJECT          = COLUMN

OBJECT              = COLUMN
  NAME              = "CHANNEL_1"
  DATA_TYPE        = ASCII_REAL
  START_BYTE        = 26
  BYTES             = 9
  FORMAT            = "F9.4"
  UNIT              = "METER PER SECOND SQUARED"
  MISSING_CONSTANT  = 9999.9999
  DESCRIPTION       = "Acceleration data"
END_OBJECT          = COLUMN

OBJECT              = COLUMN
  NAME              = "RELATIVE_TIME_2"
  DATA_TYPE        = ASCII_REAL
  START_BYTE        = 36
  BYTES             = 10
  UNIT              = "MILLISECOND"
  FORMAT            = "F10.3"
  MISSING_CONSTANT  = 99999.999
  DESCRIPTION       = "Channel 2 time relative to
                       start time of the measurement"
END_OBJECT          = COLUMN

OBJECT              = COLUMN
  NAME              = "CHANNEL_2"
  DATA_TYPE        = ASCII_REAL
  START_BYTE        = 47
  BYTES             = 9
  FORMAT            = "F9.4"
  UNIT              = "METER PER SECOND SQUARED"
  MISSING_CONSTANT  = 99999.9999
  DESCRIPTION       = "Acceleration data"
END_OBJECT          = COLUMN

OBJECT              = COLUMN
  NAME              = "RELATIVE_TIME_3"
  DATA_TYPE        = ASCII_REAL
  START_BYTE        = 57
  BYTES             = 10
```

UNIT = "MILLISECOND"  
FORMAT = "F10.3"  
MISSING\_CONSTANT = 99999.999  
DESCRIPTION = "Channel 3 time relative to  
start time of the measurement"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "CHANNEL\_3"  
DATA\_TYPE = ASCII\_REAL  
START\_BYTE = 68  
BYTES = 9  
FORMAT = "F9.4"  
UNIT = "METER PER SECOND SQUARED"  
MISSING\_CONSTANT = 9999.9999  
DESCRIPTION = "Acceleration data"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "RELATIVE\_TIME\_4"  
DATA\_TYPE = ASCII\_REAL  
START\_BYTE = 78  
BYTES = 10  
UNIT = "MILLISECOND"  
FORMAT = "F10.3"  
MISSING\_CONSTANT = 99999.999  
DESCRIPTION = "Channel 4 time relative to  
start time of the measurement"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "CHANNEL\_4"  
DATA\_TYPE = ASCII\_REAL  
START\_BYTE = 89  
BYTES = 9  
FORMAT = "F9.4"  
UNIT = "METER PER SECOND SQUARED"  
MISSING\_CONSTANT = 9999.9999  
DESCRIPTION = "Acceleration data"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "RELATIVE\_TIME\_5"  
DATA\_TYPE = ASCII\_REAL  
START\_BYTE = 99  
BYTES = 10  
UNIT = "MILLISECOND"  
FORMAT = "F10.3"  
MISSING\_CONSTANT = 99999.999  
DESCRIPTION = "Channel 5 time relative to  
start time of the measurement"  
END\_OBJECT = COLUMN

```
OBJECT = COLUMN
  NAME = "CHANNEL_5"
  DATA_TYPE = ASCII_REAL
  START_BYTE = 110
  BYTES = 9
  FORMAT = "F9.4"
  UNIT = "METER PER SECOND SQUARED"
  MISSING_CONSTANT = 9999.9999
  DESCRIPTION = "Acceleration data"
END_OBJECT = COLUMN

OBJECT = COLUMN
  NAME = "RELATIVE_TIME_6"
  DATA_TYPE = ASCII_REAL
  START_BYTE = 120
  BYTES = 10
  UNIT = "MILLISECOND"
  FORMAT = "F10.3"
  MISSING_CONSTANT = 99999.999
  DESCRIPTION = "Channel 6 time relative to
                start time of the measurement"
END_OBJECT = COLUMN

OBJECT = COLUMN
  NAME = "CHANNEL_6"
  DATA_TYPE = ASCII_REAL
  START_BYTE = 131
  BYTES = 9
  FORMAT = "F9.4"
  UNIT = "METER PER SECOND SQUARED"
  MISSING_CONSTANT = 9999.9999
  DESCRIPTION = "Acceleration data"
END_OBJECT = COLUMN

OBJECT = COLUMN
  NAME = "RELATIVE_TIME_7"
  DATA_TYPE = ASCII_REAL
  START_BYTE = 141
  BYTES = 10
  UNIT = "MILLISECOND"
  FORMAT = "F10.3"
  MISSING_CONSTANT = 99999.999
  DESCRIPTION = "Channel 7 time relative to
                start time of the measurement"
END_OBJECT = COLUMN

OBJECT = COLUMN
  NAME = "CHANNEL_7"
  DATA_TYPE = ASCII_REAL
  START_BYTE = 152
  BYTES = 9
  FORMAT = "F9.4"
  UNIT = "METER PER SECOND SQUARED"
```

```
MISSING_CONSTANT = 9999.9999
DESCRIPTION      = "Acceleration data"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
NAME           = "RELATIVE_TIME_8"
DATA_TYPE      = ASCII_REAL
START_BYTE     = 162
BYTES          = 10
UNIT           = "MILLISECOND"
FORMAT         = "F10.3"
MISSING_CONSTANT = 99999.999
DESCRIPTION    = "Channel 8 time relative to
                  start time of the measurement"
END_OBJECT     = COLUMN

OBJECT          = COLUMN
NAME           = "CHANNEL_8"
DATA_TYPE      = ASCII_REAL
START_BYTE     = 173
BYTES          = 9
FORMAT         = "F9.4"
UNIT           = "METER PER SECOND SQUARED"
MISSING_CONSTANT = 9999.9999
DESCRIPTION    = "Acceleration data"
END_OBJECT     = COLUMN

OBJECT          = COLUMN
NAME           = "RELATIVE_TIME_9"
DATA_TYPE      = ASCII_REAL
START_BYTE     = 183
BYTES          = 10
UNIT           = "MILLISECOND"
FORMAT         = "F10.3"
MISSING_CONSTANT = 99999.999
DESCRIPTION    = "Channel 9 time relative to
                  start time of the measurement"
END_OBJECT     = COLUMN

OBJECT          = COLUMN
NAME           = "CHANNEL_9"
DATA_TYPE      = ASCII_REAL
START_BYTE     = 194
BYTES          = 9
FORMAT         = "F9.4"
UNIT           = "METER PER SECOND SQUARED"
MISSING_CONSTANT = 9999.9999
DESCRIPTION    = "Acceleration data"
END_OBJECT     = COLUMN

OBJECT          = COLUMN
NAME           = "RELATIVE_TIME_10"
DATA_TYPE      = ASCII_REAL
```

START\_BYTE = 204  
BYTES = 10  
UNIT = "MILLISECOND"  
FORMAT = "F10.3"  
MISSING\_CONSTANT = 9999.999  
DESCRIPTION = "Channel 10 time relative to  
start time of the measurement"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "CHANNEL\_10"  
DATA\_TYPE = ASCII\_REAL  
START\_BYTE = 215  
BYTES = 9  
FORMAT = "F9.4"  
UNIT = "METER PER SECOND SQUARED"  
MISSING\_CONSTANT = 9999.9999  
DESCRIPTION = "Acceleration data"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "RELATIVE\_TIME\_11"  
DATA\_TYPE = ASCII\_REAL  
START\_BYTE = 225  
BYTES = 10  
UNIT = "MILLISECOND"  
FORMAT = "F10.3"  
MISSING\_CONSTANT = 9999.999  
DESCRIPTION = "Channel 11 time relative to  
start time of the measurement"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "CHANNEL\_11"  
DATA\_TYPE = ASCII\_REAL  
START\_BYTE = 236  
BYTES = 9  
FORMAT = "F9.4"  
UNIT = "METER PER SECOND SQUARED"  
MISSING\_CONSTANT = 9999.9999  
DESCRIPTION = "Acceleration data"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "RELATIVE\_TIME\_12"  
DATA\_TYPE = ASCII\_REAL  
START\_BYTE = 246  
BYTES = 10  
UNIT = "MILLISECOND"  
FORMAT = "F10.3"  
MISSING\_CONSTANT = 9999.999  
DESCRIPTION = "Channel 12 time relative to  
start time of the measurement"

```

END_OBJECT          = COLUMN

OBJECT              = COLUMN
  NAME              = "CHANNEL_12"
  DATA_TYPE        = ASCII_REAL
  START_BYTE        = 257
  BYTES             = 9
  FORMAT            = "F9.4"
  UNIT              = "METER PER SECOND SQUARED"
  MISSING_CONSTANT = 9999.9999
  DESCRIPTION       = "Acceleration data"
END_OBJECT          = COLUMN
  
```

#### 4.3.3.4.1.5 CASSE temperatures after measurement (level 3)

The feet temperatures (accelerometers and transmitters) can be acquired also after a measurement (sounding or listening). They will be stored in ASCII table described by a TABLE object.

```

OBJECT              = TAFT
  NAME              = TAFT
  INTERCHANGE_FORMAT = ASCII
  ROWS              =
  COLUMNS          =
  ROW_BYTES         =
  ^STRUCTURE        = "TAFT3.FMT"
END_OBJECT          = TAFT
  
```

The structure of the “after measurement temperatures” TABLE object for FM2 is defined in the file TAFT3.FMT-

```

OBJECT              = COLUMN
  NAME              = "SESAME_SEQ_ID"
  DATA_TYPE        = ASCII_INTEGER
  START_BYTE        = 1
  BYTES             = 6
  UNIT              = "N/A"
  FORMAT            = "I6"
  DESCRIPTION       = "Sequence ID in the current data file"
END_OBJECT          = COLUMN

OBJECT              = COLUMN
  NAME              = "MEAS_ID"
  DATA_TYPE        = ASCII_INTEGER
  START_BYTE        = 8
  BYTES             = 6
  FORMAT            = "I6"
  UNIT              = "N/A"
  DESCRIPTION       = "Measurement ID in the current sequence"
END_OBJECT          = COLUMN

OBJECT              = COLUMN
  NAME              = "TEMP_FOOT-Y_TRM"
  DATA_TYPE        = ASCII_REAL
  
```

START\_BYTE = 15  
BYTES = 6  
FORMAT = "F6.2"  
UNIT = "KELVIN"  
DESCRIPTION = "Foot temperature before measurement"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "TEMP\_FOOT-Y\_ACC"  
DATA\_TYPE = ASCII\_REAL  
START\_BYTE = 22  
BYTES = 6  
FORMAT = "F6.2"  
UNIT = "KELVIN"  
DESCRIPTION = "Foot temperature before measurement"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "TEMP\_FOOT+X\_TRM"  
DATA\_TYPE = ASCII\_REAL  
START\_BYTE = 29  
BYTES = 6  
FORMAT = "F6.2"  
UNIT = "KELVIN"  
DESCRIPTION = "Foot temperature before measurement"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "TEMP\_FOOT+X\_ACC"  
DATA\_TYPE = ASCII\_REAL  
START\_BYTE = 36  
BYTES = 6  
FORMAT = "F6.2"  
UNIT = "KELVIN"  
DESCRIPTION = "Foot temperature before measurement"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "TEMP\_FOOT+Y\_TRM"  
DATA\_TYPE = ASCII\_REAL  
START\_BYTE = 43  
BYTES = 6  
FORMAT = "F6.2"  
UNIT = "KELVIN"  
DESCRIPTION = "Foot temperature before measurement"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "TEMP\_FOOT+Y\_ACC"  
DATA\_TYPE = ASCII\_REAL  
START\_BYTE = 50  
BYTES = 6  
FORMAT = "F6.2"



```
UNIT = "KELVIN"  
DESCRIPTION = "Foot temperature before measurement"  
END_OBJECT = COLUMN
```

The structure of the "after measurement temperatures" TABLE object for FM3 is defined in the file TAFT3\_FM3.FMT:

```
OBJECT = COLUMN  
NAME = "SESAME_SEQ_ID"  
DATA_TYPE = ASCII_INTEGER  
START_BYTE = 1  
BYTES = 6  
UNIT = "N/A"  
FORMAT = "I6"  
DESCRIPTION = "Sequence ID in the current data file"  
END_OBJECT = COLUMN
```

```
OBJECT = COLUMN  
NAME = "MEAS_ID"  
DATA_TYPE = ASCII_INTEGER  
START_BYTE = 8  
BYTES = 6  
FORMAT = "I6"  
UNIT = "N/A"  
DESCRIPTION = "Measurement ID in the current sequence"  
END_OBJECT = COLUMN
```

```
OBJECT = COLUMN  
NAME = "TEMP_FOOT-Y_TRM"  
DATA_TYPE = ASCII_REAL  
START_BYTE = 15  
BYTES = 6  
FORMAT = "F6.2"  
UNIT = "KELVIN"  
DESCRIPTION = "Sensor temperature after measurement"  
END_OBJECT = COLUMN
```

```
OBJECT = COLUMN  
NAME = "TEMP_FOOT-Y_ACC"  
DATA_TYPE = ASCII_REAL  
START_BYTE = 22  
BYTES = 6  
FORMAT = "F6.2"  
UNIT = "KELVIN"  
DESCRIPTION = "Sensor temperature after measurement"  
END_OBJECT = COLUMN
```

```
OBJECT = COLUMN  
NAME = "TEMP_FOOT+X_TRM"  
DATA_TYPE = ASCII_REAL  
START_BYTE = 29  
BYTES = 6  
FORMAT = "F6.2"
```

UNIT = "KELVIN"  
DESCRIPTION = "Sensor temperature after measurement"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "TEMP\_FOOT+X\_ACC"  
DATA\_TYPE = ASCII\_REAL  
START\_BYTE = 36  
BYTES = 6  
FORMAT = "F6.2"  
UNIT = "KELVIN"  
DESCRIPTION = "Sensor temperature after measurement"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "TEMP\_FOOT+Y\_TRM"  
DATA\_TYPE = ASCII\_REAL  
START\_BYTE = 43  
BYTES = 6  
FORMAT = "F6.2"  
UNIT = "KELVIN"  
DESCRIPTION = "Sensor temperature after measurement"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "TEMP\_FOOT+Y\_ACC"  
DATA\_TYPE = ASCII\_REAL  
START\_BYTE = 50  
BYTES = 6  
FORMAT = "F6.2"  
UNIT = "KELVIN"  
DESCRIPTION = "Sensor temperature after measurement"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "CASSE\_PCB\_TEMP"  
DATA\_TYPE = ASCII\_REAL  
START\_BYTE = 57  
BYTES = 6  
FORMAT = "F6.2"  
UNIT = "KELVIN"  
DESCRIPTION = "CASSE PCB temperature"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "RADFET\_VOLTAGE"  
DATA\_TYPE = ASCII\_REAL  
START\_BYTE = 64  
BYTES = 6  
FORMAT = "F6.3"  
UNIT = "VOLT"  
DESCRIPTION = "RadFET voltage"  
END\_OBJECT = COLUMN

### 4.3.3.4.1.6 Structure of FM-3 Statistics data (level 3)

The channel statistics data are described by a TABLE object.

```
OBJECT          = STAT
  NAME          = STAT
  INTERCHANGE_FORMAT = ASCII
  ROWS          =
  COLUMNS      =
  ROW_BYTES     =
  ^STRUCTURE    = "STAT2_FM3.FMT"
  END_OBJECT    = STAT
```

The structure of the Sequence parameters TABLE object is defined in the file STAT2\_FM3.FMT.

```
OBJECT          = COLUMN
  NAME          = "SESAME_SEQ_ID"
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 1
  BYTES        = 6
  UNIT         = "N/A"
  FORMAT       = "I6"
  DESCRIPTION   = "Sequence ID in the current data file"
  END_OBJECT    = COLUMN
```

```
OBJECT          = COLUMN
  NAME          = "MEAS_ID"
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 8
  BYTES        = 6
  FORMAT       = "I6"
  UNIT         = "N/A"
  DESCRIPTION   = "Measurement ID in the current sequence"
  END_OBJECT    = COLUMN
```

```
OBJECT          = COLUMN
  NAME          = "CHANNEL_1_MIN"
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 15
  BYTES        = 4
  FORMAT       = "I4"
  UNIT         = "N/A"
  MISSING_CONSTANT = 9999
  DESCRIPTION   = "Channel 1 minimal sample value in
                  ADC non-linear format"
  END_OBJECT    = COLUMN
```

```
OBJECT          = COLUMN
  NAME          = "CHANNEL_1_MAX"
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 20
  BYTES        = 4
```

```
FORMAT          = "I4"
UNIT            = "N/A"
MISSING_CONSTANT = 9999
DESCRIPTION     = "Channel 1 maximal sample value in
                  ADC non-linear format"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
NAME           = "CHANNEL_1_MEAN"
DATA_TYPE      = ASCII_REAL
START_BYTE     = 25
BYTES          = 6
FORMAT        = "F6.1"
UNIT          = "N/A"
MISSING_CONSTANT = 9999.9
DESCRIPTION    = "Channel 1 mean of linearized ADC sample values"
END_OBJECT     = COLUMN

OBJECT          = COLUMN
NAME           = "CHANNEL_2_MIN"
DATA_TYPE      = ASCII_INTEGER
START_BYTE     = 32
BYTES          = 4
FORMAT        = "I4"
UNIT          = "N/A"
MISSING_CONSTANT = 9999
DESCRIPTION    = "Channel 2 minimal sample value in
                  ADC non-linear format"
END_OBJECT     = COLUMN

OBJECT          = COLUMN
NAME           = "CHANNEL_2_MAX"
DATA_TYPE      = ASCII_INTEGER
START_BYTE     = 37
BYTES          = 4
FORMAT        = "I4"
UNIT          = "N/A"
MISSING_CONSTANT = 9999
DESCRIPTION    = "Channel 2 maximal sample value in
                  ADC non-linear format"
END_OBJECT     = COLUMN

OBJECT          = COLUMN
NAME           = "CHANNEL_2_MEAN"
DATA_TYPE      = ASCII_REAL
START_BYTE     = 42
BYTES          = 6
FORMAT        = "F6.1"
UNIT          = "N/A"
MISSING_CONSTANT = 9999.9
DESCRIPTION    = "Channel 2 mean of linearized ADC sample values"
END_OBJECT     = COLUMN
```

OBJECT = COLUMN  
NAME = "CHANNEL\_3\_MIN"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 49  
BYTES = 4  
FORMAT = "I4"  
UNIT = "N/A"  
MISSING\_CONSTANT = 9999  
DESCRIPTION = "Channel 3 minimal sample value in  
ADC non-linear format"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "CHANNEL\_3\_MAX"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 54  
BYTES = 4  
FORMAT = "I4"  
UNIT = "N/A"  
MISSING\_CONSTANT = 9999  
DESCRIPTION = "Channel 3 maximal sample value in  
ADC non-linear format"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "CHANNEL\_3\_MEAN"  
DATA\_TYPE = ASCII\_REAL  
START\_BYTE = 59  
BYTES = 6  
FORMAT = "F6.1"  
UNIT = "N/A"  
MISSING\_CONSTANT = 9999.9  
DESCRIPTION = "Channel 3 mean of linearized ADC sample values"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "CHANNEL\_4\_MIN"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 66  
BYTES = 4  
FORMAT = "I4"  
UNIT = "N/A"  
MISSING\_CONSTANT = 9999  
DESCRIPTION = "Channel 4 minimal sample value in  
ADC non-linear format"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "CHANNEL\_4\_MAX"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 71  
BYTES = 4  
FORMAT = "I4"

```
UNIT = "N/A"
MISSING_CONSTANT = 9999
DESCRIPTION = "Channel 4 maximal sample value in
              ADC non-linear format"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "CHANNEL_4_MEAN"
DATA_TYPE = ASCII_REAL
START_BYTE = 76
BYTES = 6
FORMAT = "F6.1"
UNIT = "N/A"
MISSING_CONSTANT = 9999.9
DESCRIPTION = "Channel 4 mean of linearized ADC sample values"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "CHANNEL_5_MIN"
DATA_TYPE = ASCII_INTEGER
START_BYTE = 83
BYTES = 4
FORMAT = "I4"
UNIT = "N/A"
MISSING_CONSTANT = 9999
DESCRIPTION = "Channel 5 minimal sample value in
              ADC non-linear format"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "CHANNEL_5_MAX"
DATA_TYPE = ASCII_INTEGER
START_BYTE = 88
BYTES = 4
FORMAT = "I4"
UNIT = "N/A"
MISSING_CONSTANT = 9999
DESCRIPTION = "Channel5 maximal sample value in
              ADC non-linear format"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "CHANNEL_5_MEAN"
DATA_TYPE = ASCII_REAL
START_BYTE = 93
BYTES = 6
FORMAT = "F6.1"
UNIT = "N/A"
MISSING_CONSTANT = 9999.9
DESCRIPTION = "Channel 5 mean of linearized ADC sample values"
END_OBJECT = COLUMN

OBJECT = COLUMN
```

```

NAME                = "CHANNEL_6_MIN"
DATA_TYPE           = ASCII_INTEGER
START_BYTE         = 100
BYTES              = 4
FORMAT             = "I4"
UNIT               = "N/A"
MISSING_CONSTANT   = 9999
DESCRIPTION        = "Channel 6 minimal sample value in
                    ADC non-linear format"
END_OBJECT         = COLUMN

OBJECT              = COLUMN
NAME                = "CHANNEL_6_MAX"
DATA_TYPE           = ASCII_INTEGER
START_BYTE         = 105
BYTES              = 4
FORMAT             = "I4"
UNIT               = "N/A"
MISSING_CONSTANT   = 9999
DESCRIPTION        = "Channel 6 maximal sample value in
                    ADC non-linear format"
END_OBJECT         = COLUMN

OBJECT              = COLUMN
NAME                = "CHANNEL_6_MEAN"
DATA_TYPE           = ASCII_REAL
START_BYTE         = 110
BYTES              = 6
FORMAT             = "F6.1"
UNIT               = "N/A"
MISSING_CONSTANT   = 9999.9
DESCRIPTION        = "Channel 6 mean of linearized ADC sample values"
END_OBJECT         = COLUMN

OBJECT              = COLUMN
NAME                = "CHANNEL_7_MIN"
DATA_TYPE           = ASCII_INTEGER
START_BYTE         = 117
BYTES              = 4
FORMAT             = "I4"
UNIT               = "N/A"
MISSING_CONSTANT   = 9999
DESCRIPTION        = "Channel 7 minimal sample value in
                    ADC non-linear format"
END_OBJECT         = COLUMN

OBJECT              = COLUMN
NAME                = "CHANNEL_7_MAX"
DATA_TYPE           = ASCII_INTEGER
START_BYTE         = 122
BYTES              = 4
FORMAT             = "I4"
UNIT               = "N/A"
  
```

```
MISSING_CONSTANT = 9999
DESCRIPTION      = "Channel 7 maximal sample value in
                  ADC non-linear format"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
NAME            = "CHANNEL_7_MEAN"
DATA_TYPE      = ASCII_REAL
START_BYTE     = 127
BYTES          = 6
FORMAT         = "F6.1"
UNIT           = "N/A"
MISSING_CONSTANT = 9999.9
DESCRIPTION    = "Channel 7 mean of linearized ADC sample values"
END_OBJECT     = COLUMN

OBJECT          = COLUMN
NAME            = "CHANNEL_8_MIN"
DATA_TYPE      = ASCII_INTEGER
START_BYTE     = 134
BYTES          = 4
FORMAT         = "I4"
UNIT           = "N/A"
MISSING_CONSTANT = 9999
DESCRIPTION    = "Channel 8 minimal sample value in
                  ADC non-linear format"
END_OBJECT     = COLUMN

OBJECT          = COLUMN
NAME            = "CHANNEL_8_MAX"
DATA_TYPE      = ASCII_INTEGER
START_BYTE     = 139
BYTES          = 4
FORMAT         = "I4"
UNIT           = "N/A"
MISSING_CONSTANT = 9999
DESCRIPTION    = "Channel 8 maximal sample value in
                  ADC non-linear format"
END_OBJECT     = COLUMN

OBJECT          = COLUMN
NAME            = "CHANNEL_8_MEAN"
DATA_TYPE      = ASCII_REAL
START_BYTE     = 144
BYTES          = 6
FORMAT         = "F6.1"
UNIT           = "N/A"
MISSING_CONSTANT = 9999.9
DESCRIPTION    = "Channel 8 mean of linearized ADC sample values"
END_OBJECT     = COLUMN

OBJECT          = COLUMN
NAME            = "CHANNEL_9_MIN"
```



```

DATA_TYPE      = ASCII_INTEGER
START_BYTE     = 151
BYTES          = 4
FORMAT         = "I4"
UNIT           = "N/A"
MISSING_CONSTANT = 9999
DESCRIPTION    = "Channel 9 minimal sample value in
                  ADC non-linear format"
END_OBJECT     = COLUMN

OBJECT         = COLUMN
NAME           = "CHANNEL_9_MAX"
DATA_TYPE     = ASCII_INTEGER
START_BYTE    = 156
BYTES         = 4
FORMAT        = "I4"
UNIT          = "N/A"
MISSING_CONSTANT = 9999
DESCRIPTION   = "Channel 9 maximal sample value in
                  ADC non-linear format"
END_OBJECT    = COLUMN

OBJECT         = COLUMN
NAME           = "CHANNEL_9_MEAN"
DATA_TYPE     = ASCII_REAL
START_BYTE    = 161
BYTES         = 6
FORMAT        = "F6.1"
UNIT          = "N/A"
MISSING_CONSTANT = 9999.9
DESCRIPTION   = "Channel 9 mean of linearized ADC sample values"
END_OBJECT    = COLUMN

OBJECT         = COLUMN
NAME           = "CHANNEL_10_MIN"
DATA_TYPE     = ASCII_INTEGER
START_BYTE    = 168
BYTES         = 4
FORMAT        = "I4"
UNIT          = "N/A"
MISSING_CONSTANT = 9999
DESCRIPTION   = "Channel 10 minimal sample value in
                  ADC non-linear format"
END_OBJECT    = COLUMN

OBJECT         = COLUMN
NAME           = "CHANNEL_10_MAX"
DATA_TYPE     = ASCII_INTEGER
START_BYTE    = 173
BYTES         = 4
FORMAT        = "I4"
UNIT          = "N/A"
MISSING_CONSTANT = 9999
  
```

DESCRIPTION = "Channel 10 maximal sample value in  
ADC non-linear format"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "CHANNEL\_10\_MEAN"  
DATA\_TYPE = ASCII\_REAL  
START\_BYTE = 178  
BYTES = 6  
FORMAT = "F6.1"  
UNIT = "N/A"  
MISSING\_CONSTANT = 9999.9  
DESCRIPTION = "Channel 10 mean of linearized ADC sample values"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "CHANNEL\_11\_MIN"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 185  
BYTES = 4  
FORMAT = "I4"  
UNIT = "N/A"  
MISSING\_CONSTANT = 9999  
DESCRIPTION = "Channel 11 minimal sample value in  
ADC non-linear format"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "CHANNEL\_11\_MAX"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 190  
BYTES = 4  
FORMAT = "I4"  
UNIT = "N/A"  
MISSING\_CONSTANT = 9999  
DESCRIPTION = "Channel 11 maximal sample value in  
ADC non-linear format"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "CHANNEL\_11\_MEAN"  
DATA\_TYPE = ASCII\_REAL  
START\_BYTE = 195  
BYTES = 6  
FORMAT = "F6.1"  
UNIT = "N/A"  
MISSING\_CONSTANT = 9999.9  
DESCRIPTION = "Channel 11 mean of linearized ADC sample values"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "CHANNEL\_12\_MIN"  
DATA\_TYPE = ASCII\_INTEGER

```

START_BYTE = 202
BYTES      = 4
FORMAT     = "I4"
UNIT       = "N/A"
MISSING_CONSTANT = 9999
DESCRIPTION = "Channel 12 minimal sample value in
              ADC non-linear format"
END_OBJECT = COLUMN

OBJECT     = COLUMN
NAME      = "CHANNEL_12_MAX"
DATA_TYPE = ASCII_INTEGER
START_BYTE = 207
BYTES     = 4
FORMAT    = "I4"
UNIT      = "N/A"
MISSING_CONSTANT = 9999
DESCRIPTION = "Channel 12 maximal sample value in
              ADC non-linear format"
END_OBJECT = COLUMN

OBJECT     = COLUMN
NAME      = "CHANNEL_12_MEAN"
DATA_TYPE = ASCII_REAL
START_BYTE = 212
BYTES     = 6
FORMAT    = "F6.1"
UNIT      = "N/A"
MISSING_CONSTANT = 9999.9
DESCRIPTION = "Channel 12 mean of linearized ADC sample values"
END_OBJECT = COLUMN
  
```

#### 4.3.3.4.2 PP Data object definition (level 3)

##### 4.3.3.4.2.1 PP Active mode test

During an active mode test, one active PP measurement is performed. Adjusted and measured values (DAC table read back from PP memory, time series of transmitter current and receiver voltage samples) are sent to ground. Telemetry concludes with the results of the on-board data evaluation. Adjustable parameters of command active mode test are the configuration of electrodes, the transmitting frequency and the number of sine waves. Parameters are calibrated to voltages and currents where possible. For time series the relative offset from the first sample is given as fractions of a second.

The PP AMTEST data are organized as tables containing parameters, the DAC table read back from PP memory, transmitter and receiver time series. The tables are kept in separate data files (combined detached labels). Consequently there will be one PDS label pointing to four data files.

Following is an example of PDS files corresponding to an AMTEST measurement.

- SES\_FS3\_PAM\_070929214512\_TEST.LBL** (label)
- SES\_FS3\_PAM\_070929214512\_TPAR.TAB (parameters)
- SES\_FS3\_PAM\_070929214512\_TDAC.TAB (DAC table)
- SES\_FS3\_PAM\_070929214512\_TTX.TAB (transmitter time series)
- SES\_FS3\_PAM\_070929214512\_TRX.TAB (receiver time series)

The parameters are described by the following TABLE object.

```
OBJECT          = AMTESTPARC_TABLE
NAME            = AMTESTPARC
INTERCHANGE_FORMAT = ASCII
ROWS           = 1
COLUMNS       = 9
ROW_BYTES      = 90
^STRUCTURE     = "PP_AMT_PARC.FMT"
END_OBJECT     = AMTESTPARC_TABLE
```

The structure of the parameters table is described in the file PP\_AMT\_PARC.FMT.

```
/* PP AMTEST sensor settings / calibrated, version 2, 2015-11-14 */
```

```
OBJECT          = COLUMN
NAME            = "SESAME_SEQ_ID"
DATA_TYPE       = ASCII_INTEGER
START_BYTE      = 1
BYTES          = 6
UNIT            = "N/A"
FORMAT          = "I6"
DESCRIPTION     = "Sequence ID in the current data file"
END_OBJECT     = COLUMN
```

```
OBJECT          = COLUMN
NAME            = "UTC"
DATA_TYPE       = TIME
START_BYTE      = 8
BYTES          = 23
DESCRIPTION     = "Measurement start time (UTC in PDS standard
format YYYY-MM-DDThh:mm:ss.sss)"
END_OBJECT     = COLUMN
```

```
OBJECT          = COLUMN
NAME            = "SESAME_LOCAL_TIME"
DATA_TYPE       = ASCII_INTEGER
START_BYTE      = 32
BYTES          = 15
FORMAT          = "I15"
DESCRIPTION     = "Measurement start time. SESAME local time
(SLT) runs with a resolution of 1/32 seconds.
SLT represents the least significant 32 bits
of LOBT. The most significant 5 bits are in
CDMS RSST (see SESAME Ready Message)"
END_OBJECT     = COLUMN
```

```
OBJECT          = COLUMN
NAME            = "SENSOR_SETTINGS"
DATA_TYPE       = ASCII_INTEGER
START_BYTE      = 48
BYTES          = 7
UNIT            = "N/A"
DESCRIPTION     = "Commanded (echoed) electrode combination
as 3-digit hexadecimal code 16#abi#"
```

with the following meaning:

a: electrode connected to the TX A output.

Possible values:

- 0 [none],
- 1 [+X leg],
- 2 [MUPUS PEN]

b: electrode connected to the TX B output.

Possible values:

- 0 [none],
- 2 [MUPUS PEN],
- 3 [APXS]

i: input channel

Possible values:

- 0 [potential difference]
- 1 [current at +X leg]
- 2 [current at MUPUS PEN]
- 3 [current at APXS]
- 4 [direct measurement at +Y foot]
- 5 [direct measurement at -Y foot]
- 6 [reference voltage -2.5 V]
- 7 [reference voltage +2.5 V] "

END\_OBJECT = COLUMN

OBJECT = COLUMN

NAME = "NOMINAL\_FREQUENCY"

DATA\_TYPE = ASCII\_INTEGER

START\_BYTE = 56

BYTES = 5

UNIT = "HZ"

FORMAT = "I5"

DESCRIPTION = "Nominal transmitter frequency "

END\_OBJECT = COLUMN

OBJECT = COLUMN

NAME = "CORRECTED\_FREQUENCY"

DATA\_TYPE = ASCII\_REAL

START\_BYTE = 62

BYTES = 8

UNIT = "HZ"

FORMAT = "F8.2"

DESCRIPTION = "Corrected transmitter frequency"

END\_OBJECT = COLUMN

OBJECT = COLUMN

NAME = "NUMBER\_OF\_WAVES"

DATA\_TYPE = ASCII\_INTEGER

START\_BYTE = 71

BYTES = 2

UNIT = "N/A"

FORMAT = I2

DESCRIPTION = "Number of generated transmitter sine waves "

END\_OBJECT = COLUMN

```
OBJECT          = COLUMN
  NAME          = "NUMBER_OF_SAMPLES"
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 74
  BYTES        = 5
  UNIT         = "N/A"
  FORMAT       = "I5"
  DESCRIPTION   = "Number of transmitter current and receiver voltage
  samples "
END_OBJECT      = COLUMN
```

```
OBJECT          = COLUMN
  NAME          = "ERROR_CODE"
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 80
  BYTES        = 8
  UNIT         = "N/A"
  MISSING_CONSTANT = 16#0000#
  DESCRIPTION   = "Active mode results
  Hex value as 16#xxxx#. The possible values are:
  8001 Invalid register address.
  8002 Error verifying register write.
  8004 Error accessing power register.
  8008 MUX setting not allowed.
  8010 Error accessing PP RAM.
  8020 Tried to start measurement but a measurement
  is already running.
  0040 Error during writing to instrument.
  0080 Error during reading from instrument.
  0100 Error using ADC of C-DPU.
  0200 Error during DAC table generation.
  0400 Calculated number of samples > N_SAMP_MAX.
  8800 C-DPU memory exhausted.
  9000 Measurement time out.
  2000 Invalid command parameter.
  8000 Flag indicates fatal error. "
END_OBJECT      = COLUMN
```

The DAC table is described by the following TABLE object.

```
OBJECT          = AMTESTDAC_TABLE
  NAME          = AMTESTDAC
  INTERCHANGE_FORMAT = ASCII
  ROWS          = 256
  COLUMNS      = 5
  ROW_BYTES     = 60
  ^STRUCTURE    = "PP_AMT_DACC.FMT"
END_OBJECT      = AMTESTDAC_TABLE
```

The structure of the DAC table is described in the file PP\_AMT\_DACC.FMT.

```
OBJECT          = COLUMN
```

```
NAME = "SESAME_SEQ_ID"
DATA_TYPE = ASCII_INTEGER
START_BYTE = 1
BYTES = 6
UNIT = "N/A"
FORMAT = "I6"
DESCRIPTION = "Sequence ID in the current data file"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "UTC"
DATA_TYPE = TIME
START_BYTE = 8
BYTES = 23
DESCRIPTION = "Measurement start time (UTC in PDS standard
format YYYY-MM-DDThh:mm:ss.sss)"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "SESAME_LOCAL_TIME"
DATA_TYPE = ASCII_INTEGER
START_BYTE = 32
BYTES = 15
FORMAT = "I15"
DESCRIPTION = "Measurement start time. SESAME local time
(SLT) runs with a resolution of 1/32 seconds.
SLT represents the least significant 32 bits
of LOBT. The most significant 5 bits are in
CDMS RSST (see SESAME Ready Message)"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "DAC_TIME_OFFSET"
DATA_TYPE = ASCII_REAL
START_BYTE = 48
BYTES = 7
UNIT = "MILLISECOND"
FORMAT = "F7.3"
DESCRIPTION = "DAC time offset from start of wave"
END_OBJECT = COLUMN

OBJECT = COLUMN
NAME = "DAC_VOLTAGE"
DATA_TYPE = ASCII_REAL
START_BYTE = 56
BYTES = 7
UNIT = "VOLT"
FORMAT = "F7.3"
DESCRIPTION = "Transmitter electrode difference voltage "
END_OBJECT = COLUMN
```

The receiver time series is described by the following TABLE object.

```
OBJECT          = AMTESTRX_TABLE
NAME            = AMTESTRX
INTERCHANGE_FORMAT = ASCII
ROWS           = 8192
COLUMNS       = 5
ROW_BYTES      = 77
^STRUCTURE     = "PP_AMT_RXC.FMT"
END_OBJECT     = AMT_RX_TABLE
```

The structure of the receiver time series table is described in the file PP\_AMT\_RXC.FMT.

```
OBJECT          = COLUMN
NAME            = "SESAME_SEQ_ID"
DATA_TYPE       = ASCII_INTEGER
START_BYTE     = 1
BYTES          = 6
UNIT           = "N/A"
FORMAT         = "I6"
DESCRIPTION     = "Sequence ID in the current data file"
END_OBJECT     = COLUMN
```

```
OBJECT          = COLUMN
NAME            = "UTC"
DATA_TYPE       = TIME
START_BYTE     = 8
BYTES          = 23
DESCRIPTION     = "Measurement start time (UTC in PDS standard
                  format YYYY-MM-DDThh:mm:ss.sss)"
END_OBJECT     = COLUMN
```

```
OBJECT          = COLUMN
NAME            = "SESAME_LOCAL_TIME"
DATA_TYPE       = ASCII_INTEGER
START_BYTE     = 32
BYTES          = 15
FORMAT         = "I15"
DESCRIPTION     = "Measurement start time. SESAME local time
                  (SLT) runs with a resolution of 1/32 seconds.
                  SLT represents the least significant 32 bits
                  of LOBT. The most significant 5 bits are in
                  CDMS RSST (see SESAME Ready Message)"
END_OBJECT     = COLUMN
```

```
OBJECT          = COLUMN
NAME            = "RX_TIME "
DATA_TYPE       = ASCII_REAL
START_BYTE     = 48
BYTES          = 8
UNIT           = "MILLISECOND"
FORMAT         = "F8.3"
DESCRIPTION     = "Relative to start time"
END_OBJECT     = COLUMN
```



```

OBJECT                = COLUMN
  NAME                = "RX_POTENTIAL_DIFFERENCE"
  DATA_TYPE          = ASCII_REAL
  START_BYTE          = 57
  BYTES               = 8
  UNIT                = "VOLT"
  FORMAT              = "F8.3"
  DESCRIPTION         = "RX potential difference "
END_OBJECT           = COLUMN
  
```

The transmitter time series is described by the following TABLE object.

```

OBJECT                = AMTESTTX_TABLE
  NAME                = AMTESTTX
  INTERCHANGE_FORMAT = ASCII
  ROWS                = 8192
  COLUMNS            = 5
  ROW_BYTES           = 68
  ^STRUCTURE          = "PP_AMT_TXC.FMT"
END_OBJECT           = AMTESTTX_TABLE
  
```

The structure of the transmitter TABLE object is defined in the file PP\_AMT\_TXC.FMT.

```

OBJECT                = COLUMN
  NAME                = "SESAME_SEQ_ID"
  DATA_TYPE          = ASCII_INTEGER
  START_BYTE          = 1
  BYTES               = 6
  UNIT                = "N/A"
  FORMAT              = "I6"
  DESCRIPTION         = "Sequence ID in the current data file"
END_OBJECT           = COLUMN
  
```

```

OBJECT                = COLUMN
  NAME                = "UTC"
  DATA_TYPE          = TIME
  START_BYTE          = 8
  BYTES               = 23
  DESCRIPTION         = "Measurement start time (UTC in PDS standard
                        format YYYY-MM-DDThh:mm:ss.sss)"
END_OBJECT           = COLUMN
  
```

```

OBJECT                = COLUMN
  NAME                = "SESAME_LOCAL_TIME"
  DATA_TYPE          = ASCII_INTEGER
  START_BYTE          = 32
  BYTES               = 15
  FORMAT              = "I15"
  DESCRIPTION         = "Measurement start time. SESAME local time
                        (SLT) runs with a resolution of 1/32 seconds.
                        SLT represents the least significant 32 bits
                        of LOBT. The most significant 5 bits are in
  
```

```

                                CDMS RSST (see SESAME Ready Message) "
END_OBJECT                       = COLUMN
  
```

```

OBJECT                           = COLUMN
  NAME                           = "TX_TIME "
  DATA_TYPE                     = ASCII_REAL
  START_BYTE                     = 48
  BYTES                          = 8
  UNIT                           = "MILLISECOND"
  FORMAT                         = "F8.3"
  DESCRIPTION                     = "Relative to start time"
END_OBJECT                       = COLUMN
  
```

```

OBJECT                           = COLUMN
  NAME                           = "TX_CURRENT"
  DATA_TYPE                     = ASCII_REAL
  START_BYTE                     = 57
  BYTES                          = 9
  UNIT                           = "MILLIAMPERE"
  FORMAT                         = "F9.6"
  DESCRIPTION                     = "Tx current at electronics' transmitter output "
END_OBJECT                       = COLUMN
  
```

#### 4.3.3.4.2.2 PP Health Check (HC) data

Following is an example of PDS files corresponding to an HC measurement.

**SES\_FS3\_PHC\_070929214512\_HC.LBL** (label)  
**SES\_FS3\_PHC\_070929214512\_HC.TAB** (parameters)

The HC data are described in the following TABLE object (simple detached label). All values are given as voltages or currents.

```

OBJECT                           = SES_PHC_TABLE
  NAME                           = "SES_PHC"
  INTERCHANGE_FORMAT             = ASCII
  ROWS                           = 1
  COLUMNS                       = 14
  ROW_BYTES                     = 144
  ^STRUCTURE                     = "PP_HCC.FMT"
END_OBJECT                       = SES_PHC_TABLE
  
```

The structure of the TABLE object is defined in the file PP\_HCC.FMT.

```

OBJECT                           = COLUMN
  NAME                           = "SESAME_SEQ_ID"
  DATA_TYPE                     = ASCII_INTEGER
  START_BYTE                     = 1
  BYTES                          = 6
  UNIT                           = "N/A"
  FORMAT                         = "I6"
  DESCRIPTION                     = "Sequence ID in the current data file"
END_OBJECT                       = COLUMN
  
```

OBJECT = COLUMN  
NAME = "UTC"  
DATA\_TYPE = TIME  
START\_BYTE = 8  
BYTES = 23  
DESCRIPTION = "Measurement start time (UTC in PDS standard  
format YYYY-MM-DDThh:mm:ss.sss)"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "SESAME\_LOCAL\_TIME"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 32  
BYTES = 15  
FORMAT = "I15"  
DESCRIPTION = "Measurement start time. SESAME local time  
(SLT) runs with a resolution of 1/32 seconds.  
SLT represents the least significant 32 bits  
of LOBT. The most significant 5 bits are in  
CDMS RSST (see SESAME Ready Message)"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "LP\_VALUE"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 48  
BYTES = 5  
UNIT = "N/A"  
FORMAT = "I5"  
DESCRIPTION = "Result count of Langmuir probe measurement/not  
calibrated "  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "ADC\_OFFSET"  
DATA\_TYPE = ASCII\_REAL  
START\_BYTE = 54  
BYTES = 7  
UNIT = "VOLT"  
FORMAT = "F7.4"  
DESCRIPTION = "Should be close to 0 V"  
END\_OBJECT = COLUMN

OBJECT = COLUMN  
NAME = "-2.5V REF"  
DATA\_TYPE = ASCII\_REAL  
START\_BYTE = 62  
BYTES = 7  
UNIT = "VOLT"  
FORMAT = "F7.4"  
DESCRIPTION = "-2.5V REF and +2.5V REF should be nearly  
symmetrical to ADC offset"  
END\_OBJECT = COLUMN

```

OBJECT          = COLUMN
  NAME          = "+2.5V_REF"
  DATA_TYPE    = ASCII_REAL
  START_BYTE    = 70
  BYTES         = 7
  UNIT          = "VOLT"
  FORMAT        = "F7.4"
  DESCRIPTION   = "-2.5V REF and +2.5V REF should be nearly
                  symmetrical to ADC offset"
END_OBJECT      = COLUMN
  
```

```

OBJECT          = COLUMN
  NAME          = "DELTA"
  DATA_TYPE    = ASCII_REAL
  START_BYTE    = 78
  BYTES         = 7
  UNIT          = "VOLT"
  FORMAT        = "F7.4"
  DESCRIPTION   = "Differential value -Y foot - +Y foot"
END_OBJECT      = COLUMN
  
```

```

OBJECT          = COLUMN
  NAME          = "LEG+Y_RX1"
  DATA_TYPE    = ASCII_REAL
  START_BYTE    = 86
  BYTES         = 8
  UNIT          = "MILLIVOLT"
  FORMAT        = "F8.3"
  DESCRIPTION   = "Direct voltage from receiver 1 at +Y leg (at 20C)"
END_OBJECT      = COLUMN
  
```

```

OBJECT          = COLUMN
  NAME          = "LEG-Y_RX2"
  DATA_TYPE    = ASCII_REAL
  START_BYTE    = 95
  BYTES         = 8
  UNIT          = "MILLIVOLT"
  FORMAT        = "F8.3"
  DESCRIPTION   = "Direct voltage from receiver 2 at -Y leg (at 20C)"
END_OBJECT      = COLUMN
  
```

```

OBJECT          = COLUMN
  NAME          = "LEG+X_TX1"
  DATA_TYPE    = ASCII_REAL
  START_BYTE    = 104
  BYTES         = 9
  UNIT          = "MILLIAMPERE"
  FORMAT        = "F9.6"
  DESCRIPTION   = "Transmitter current at electrode 1.
                  No voltage applied.
                  Should be close to 0 mA"
END_OBJECT      = COLUMN
  
```

```
OBJECT = COLUMN
  NAME = "MUPUS_PEN_TX2"
  DATA_TYPE = ASCII_REAL
  START_BYTE = 114
  BYTES = 9
  UNIT = "MILLIAMPERE"
  FORMAT = "F9.6"
  DESCRIPTION = "Transmitter current at electrode 2.
                No voltage applied.
                Should be close to 0 mA"
END_OBJECT = COLUMN

OBJECT = COLUMN
  NAME = "APXS_TX3"
  DATA_TYPE = ASCII_REAL
  START_BYTE = 124
  BYTES = 9
  UNIT = "MILLIAMPERE"
  FORMAT = "F9.6"
  DESCRIPTION = "Transmitter current at electrode 3.
                No voltage applied.
                Should be close to 0 mA"
END_OBJECT = COLUMN

OBJECT = COLUMN
  NAME = "ERROR_CODE"
  DATA_TYPE = ASCII_INTEGER
  START_BYTE = 134
  BYTES = 8
  UNIT = "N/A"
  MISSING_CONSTANT = 16#0000#
  DESCRIPTION = "Hex value as 16#xxxx#. The possible values are:
                8001 Invalid register address.
                8002 Error verifying register write.
                8004 Error accessing power register.
                8008 MUX setting not allowed.
                8010 Error accessing PP RAM.
                8020 Tried to start measurement but a measurement
                     is already running.
                0040 Error during writing to instrument.
                0080 Error during reading from instrument.
                0100 Error using ADC of C-DPU.
                0200 Error during DAC table generation.
                0400 Calculated number of samples > N_SAMP_MAX.
                8800 C-DPU memory exhausted.
                9000 Measurement time out.
                2000 Invalid command parameter.
                8000 Flag indicates fatal error. "
END_OBJECT = COLUMN
```

#### 4.3.3.4.2.3 PP Langmuir Probe Test (LM) data

This measurement sequence is mainly used for ground tests and is not a regular flight measurement. Following is an example of PDS files corresponding to an LM measurement.

**SES\_FS3\_PLM\_070929214512\_LM.LBL** (label)

SES\_FS3\_PLM\_070929214512\_LM.TAB (parameters)

The LM data are described in the following TABLE object (simple detached label).

```
OBJECT          = SES_PLM_TABLE
NAME           = "SES_LM"
INTERCHANGE_FORMAT = ASCII
ROWS          = 17
COLUMNS      = 5
ROW_BYTES     = 64
^STRUCTURE    = "PP_LMC.FMT"
END_OBJECT     = SES_PLM_TABLE
```

The structure of the TABLE object is defined in the file PP\_LMC.FMT.

/\* PP Langmuir Probe measurement /calibrated, version 2, 2015-11-14\*/

```
OBJECT          = COLUMN
NAME           = "SESAME_SEQ_ID"
DATA_TYPE      = ASCII_INTEGER
START_BYTE     = 1
BYTES         = 6
UNIT          = "N/A"
FORMAT        = "I6"
DESCRIPTION    = "Sequence ID in the current data file"
END_OBJECT     = COLUMN
```

```
OBJECT          = COLUMN
NAME           = "UTC"
DATA_TYPE      = TIME
START_BYTE     = 8
BYTES         = 23
DESCRIPTION    = "Measurement start time (UTC in PDS standard
                  format YYYY-MM-DDThh:mm:ss.sss)"
END_OBJECT     = COLUMN
```

```
OBJECT          = COLUMN
NAME           = "SESAME_LOCAL_TIME"
DATA_TYPE      = ASCII_INTEGER
START_BYTE     = 32
BYTES         = 15
FORMAT        = "I15"
DESCRIPTION    = "Measurement start time. SESAME local time
                  (SLT) runs with a resolution of 1/32 seconds.
                  SLT represents the least significant 32 bits
                  of LOBT. The most significant 5 bits are in
                  CDMS RSST (see SESAME Ready Message)"
END_OBJECT     = COLUMN
```

```

OBJECT          = COLUMN
  NAME          = "INTEGRATION_TIME"
  DATA_TYPE    = ASCII_REAL
  START_BYTE    = 48
  BYTES         = 8
  UNIT          = "MILLISECOND"
  FORMAT        = "F8.4"
  DESCRIPTION   = "Integration time until trigger limit reached"
END_OBJECT      = COLUMN
  
```

```

OBJECT          = COLUMN
  NAME          = "PLASMA_WAVE_AMPLITUDE"
  DATA_TYPE    = ASCII_REAL
  START_BYTE    = 57
  BYTES         = 5
  UNIT          = "MILLIVOLT"
  FORMAT        = "F5.2"
  MISSING_CONSTANT = "99.99"
  DESCRIPTION   = "Plasmawave amplitude at LP-detector "
END_OBJECT      = COLUMN
  
```

#### 4.3.3.4.2.4 PP Passive Mode Test (PMTEST)

The PP PMTEST data are organized as tables containing parameters, selectable analog channel time series and receiver (Rx) time series. The tables are kept in separate data files (combined detached labels). Consequently there will be one PDS label pointing to three data files. The parameters are given as calibrated voltages or frequencies where possible, the time series are given with a time offset relative to the first sample and voltages for each time series values, calibrated for pre-amplifier temperatures of +20°C. For actual temperatures the values have to be reduced according to the ratio of the preamplifier amplification, nominally 8.1, but at temperatures of -160°C close to 6.

Following is an example of PDS files corresponding to a PMTEST measurement.

- SES\_FS3\_PPM\_070929214512\_TEST.LBL** (label)
- SES\_FS3\_PPM\_070929214512\_TPAR.TAB (parameters)
- SES\_FS3\_PPM\_070929214512\_TCH.TAB (parameters)
- SES\_FS3\_PPM\_070929214512\_TRX.TAB (receiver time series)

The PMTEST parameters are described in the following TABLE object (simple detached label).

```

OBJECT          = PMTEST_PAR_TABLE
  NAME          = "PMTEST_PAR"
  INTERCHANGE_FORMAT = ASCII
  ROWS          = 12
  COLUMNS      = 11
  ROW_BYTES     = 114
  ^STRUCTURE    = "PP_PMT2_PARC.FMT"
END_OBJECT      = PMTEST_PAR_TABLE
  
```

The structure of the parameters table is described in the file PP\_PMT2\_PARC.FMT.

```

OBJECT          = COLUMN
  NAME          = "SESAME_SEQ_ID"
  
```

```
DATA_TYPE      = ASCII_INTEGER
START_BYTE     = 1
BYTES          = 6
UNIT           = "N/A"
FORMAT         = "I6"
DESCRIPTION    = "Sequence ID in the current data file"
END_OBJECT     = COLUMN

OBJECT         = COLUMN
NAME           = "UTC"
DATA_TYPE     = TIME
START_BYTE    = 8
BYTES         = 23
DESCRIPTION   = "Measurement start time (UTC in PDS standard
                format YYYY-MM-DDThh:mm:ss.sss)"
END_OBJECT    = COLUMN

OBJECT         = COLUMN
NAME           = "SESAME_LOCAL_TIME"
DATA_TYPE     = ASCII_INTEGER
START_BYTE    = 32
BYTES         = 15
FORMAT       = "I15"
DESCRIPTION   = "Measurement start time. SESAME local time
                (SLT) runs with a resolution of 1/32 seconds.
                SLT represents the least significant 32 bits
                of LOBT. The most significant 5 bits are in
                CDMS RSST (see SESAME Ready Message)"
END_OBJECT    = COLUMN

OBJECT         = COLUMN
NAME           = "LP_INT_INC"
DATA_TYPE     = ASCII_REAL
START_BYTE    = 48
BYTES         = 9
UNIT          = "SECOND"
FORMAT       = "F9.7"
DESCRIPTION   = "Time increment duration per integrator unit "
END_OBJECT    = COLUMN

OBJECT         = COLUMN
NAME           = "LP_VALUE"
DATA_TYPE     = ASCII_REAL
START_BYTE    = 58
BYTES         = 9
UNIT          = "SECOND"
FORMAT       = "F9.7"
DESCRIPTION   = "Integration time of Langmuir probe measurement "
END_OBJECT    = COLUMN

OBJECT         = COLUMN
NAME           = "LP_MEAS_ERR"
DATA_TYPE     = ASCII_INTEGER
```



```
START_BYTE      = 68
BYTES           = 8
UNIT            = "N/A"
MISSING_CONSTANT = 16#0000#
DESCRIPTION     = "Error code for LP measurement.
                  Hex value as 16#xxxx#. The possible values are:
                  8001 Invalid register address.
                  8002 Error verifying register write.
                  8004 Error accessing power register.
                  8008 MUX setting not allowed.
                  8010 Error accessing PP RAM.
                  8020 Tried to start measurement but a measurement
                        is already running.
                  0040 Error during writing to instrument.
                  0080 Error during reading from instrument.
                  0100 Error using ADC of C-DPU.
                  0200 Error during DAC table generation.
                  0400 Calculated number of samples > N_SAMP_MAX.
                  8800 C-DPU memory exhausted.
                  9000 Measurement time out.
                  2000 Invalid command parameter.
                  8000 Flag indicates fatal error. "
```

```
END_OBJECT      = COLUMN
```

```
OBJECT          = COLUMN
  NAME           = "TIME_INC"
  DATA_TYPE     = ASCII_REAL
  START_BYTE     = 77
  BYTES          = 9
  UNIT           = "SECOND"
  FORMAT         = "F9.7"
  DESCRIPTION    = "Time increment between samples"
END_OBJECT      = COLUMN
```

```
OBJECT          = COLUMN
  NAME           = "NB_SAMPLES"
  DATA_TYPE     = ASCII_INTEGER
  START_BYTE     = 87
  BYTES          = 5
  UNIT           = "N/A"
  FORMAT         = "I5"
  DESCRIPTION    = "Number of used samples (excluding skipped samples) "
```

```
END_OBJECT      = COLUMN
```

```
OBJECT          = COLUMN
  NAME           = "ERROR_CODE"
  DATA_TYPE     = ASCII_INTEGER
  START_BYTE     = 93
  BYTES          = 8
  UNIT           = "N/A"
  MISSING_CONSTANT = 16#0000#
  DESCRIPTION    = "Hex value as 16#xxxx#. The possible values are:
                  8001 Invalid register address.
```

```

8002 Error verifying register write.
8004 Error accessing power register.
8008 MUX setting not allowed.
8010 Error accessing PP RAM.
8020 Tried to start measurement but a measurement
      is already running.
0040 Error during writing to instrument.
0080 Error during reading from instrument.
0100 Error using ADC of C-DPU.
0200 Error during DAC table generation.
0400 Calculated number of samples > N_SAMP_MAX.
8800 C-DPU memory exhausted.
9000 Measurement time out.
2000 Invalid command parameter.
8000 Flag indicates fatal error. "
  
```

END\_OBJECT = COLUMN

```

OBJECT = COLUMN
  NAME = "NB_FREQ_BINS"
  DATA_TYPE = ASCII_INTEGER
  START_BYTE = 102
  BYTES = 2
  UNIT = "N/A"
  FORMAT = "I2"
  DESCRIPTION = "Number of frequency bins "
END_OBJECT = COLUMN
  
```

```

OBJECT = COLUMN
  NAME = "MATH_ERR_CODE"
  DATA_TYPE = ASCII_INTEGER
  START_BYTE = 105
  BYTES = 8
  UNIT = "N/A"
  MISSING_CONSTANT = 16#0000#
  DESCRIPTION = "Indicates errors, which can only occur during
                 on-board data reduction (hex value as 16#xxxx#).
0001 Reduce: number of vector elements odd or less
      than 2; fatal.
0002 Expand: less than four elements in input
      vector; fatal.
0004 Too much data for analysis; truncating.
0008 Too few data for analysis; padding with '128'
0010 Used number of waves is not a power of 2;
      truncated.
0020 Not the expected number of elements in
      filtered arrays; fatal.
0040 Argument for sine_table() not in valid range
      0<= deg2 <=720.
0080 Overflow in divsin() or result inexact.
0100 Too few data for trimmed mean calculation;
      regular mean used.
0200 No data for warr.mean; particular: analysis
      yields no data.
  
```

```
0400 Passive mode: not enough data in bin.  
0800 Not enough memory for data reduction."  
END_OBJECT = COLUMN
```

The PMTEST receiver data are described in the following TABLE object (simple detached label).

```
OBJECT = PMT_RX_TABLE  
NAME = PMT_RX  
INTERCHANGE_FORMAT = ASCII  
ROWS = 8192  
COLUMNS = 5  
ROW_BYTES = 66  
^STRUCTURE = "PP_PMT2_RXC.FMT"  
END_OBJECT = PMT_RX_TABLE
```

The structure of the receiver time series table is described in the file PP\_PMT2\_RXC.FMT.

```
OBJECT = COLUMN  
NAME = "SESAME_SEQ_ID"  
DATA_TYPE = ASCII_INTEGER  
START_BYTE = 1  
BYTES = 6  
UNIT = "N/A"  
FORMAT = "I6"  
DESCRIPTION = "Sequence ID in the current data file"  
END_OBJECT = COLUMN
```

```
OBJECT = COLUMN  
NAME = "UTC"  
DATA_TYPE = TIME  
START_BYTE = 8  
BYTES = 23  
DESCRIPTION = "Measurement start time (UTC in PDS standard  
format YYYY-MM-DDThh:mm:ss.sss)"  
END_OBJECT = COLUMN
```

```
OBJECT = COLUMN  
NAME = "SESAME_LOCAL_TIME"  
DATA_TYPE = ASCII_INTEGER  
START_BYTE = 32  
BYTES = 15  
FORMAT = "I15"  
DESCRIPTION = "Measurement start time. SESAME local time  
(SLT) runs with a resolution of 1/32 seconds.  
SLT represents the least significant 32 bits  
of LOBT. The most significant 5 bits are in  
CDMS RSST (see SESAME Ready Message)"  
END_OBJECT = COLUMN
```

```
OBJECT = COLUMN  
NAME = "TIME_OFFSET "  
DATA_TYPE = ASCII_REAL
```

```

START_BYTE      = 48
BYTES           = 7
UNIT            = "MILLISECOND"
FORMAT          = "F7.3"
DESCRIPTION     = "Time offset from first sample"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
NAME            = "POTENTIAL_DIFF"
DATA_TYPE       = ASCII_REAL
START_BYTE      = 56
BYTES           = 8
UNIT            = "MILLIVOLT"
FORMAT          = "F8.3"
DESCRIPTION     = "Potential Difference between +Y and -Y foot "
END_OBJECT      = COLUMN
    
```

### 4.3.3.4.3 Flight software version FM2

#### 4.3.3.4.3.1 PP Active mode test

During an active mode test, one active PP measurement is performed. Adjusted and measured values (DAC table read back from PP memory, time series of transmitter current and receiver voltage samples) are sent to ground. All values are calibrated according to frequencies or voltages where possible. Telemetry concludes with the results of the on-board data evaluation. Adjustable parameters of command active mode test are the configuration of electrodes, the transmitting frequency and amplitude and the number of sine waves. Because telemetry contains the raw time series data and the results of the on-board evaluation it is possible to check both, details of the time series and the correct working of the data evaluation.

The PP AMTEST2 data are organized as tables containing parameters including the on-board evaluation results, the DAC table read back from PP memory, transmitter and receiver time series. The tables are kept in separate data files (combined detached labels). Consequently there will be one PDS label pointing to four data files.

Following is an example of PDS files corresponding to an AMTEST2 measurement.

- SES\_FS3\_PAM\_070929214512\_TEST.LBL (label)**
- SES\_FS3\_PAM\_070929214512\_TPAR.TAB (parameters)
- SES\_FS3\_PAM\_070929214512\_TDAC.TAB (DAC table)
- SES\_FS3\_PAM\_070929214512\_TTX.TAB (transmitter time series)
- SES\_FS3\_PAM\_070929214512\_TRX.TAB (receiver time series)

The parameters are described by the following TABLE object.

```

OBJECT          = AMT2_PARC_TABLE
NAME            = AMT2_PARC
INTERCHANGE_FORMAT = ASCII
ROWS            = 1
COLUMNS        = 13
ROW_BYTES       = 111
^STRUCTURE     = "PP_AMT2_PARC.FMT"
END_OBJECT      = AMT2_PARC_TABLE
    
```

The structure of the parameters table is described in the file PP\_AMT2\_PARC.FMT.

```
/* PP AMTEST2 parameter settings / calibrated, version 3, 2015-12-16 */
```

```
OBJECT          = COLUMN
  NAME          = "SESAME_SEQ_ID"
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 1
  BYTES         = 6
  UNIT          = "N/A"
  FORMAT        = "I6"
  DESCRIPTION   = "Sequence ID in the current data file"
END_OBJECT

OBJECT          = COLUMN
  NAME          = "UTC"
  DATA_TYPE    = TIME
  START_BYTE    = 8
  BYTES         = 23
  DESCRIPTION   = "Measurement start time (UTC in PDS standard
                  format YYYY-MM-DDThh:mm:ss.sss)"
END_OBJECT

OBJECT          = COLUMN
  NAME          = "SESAME_LOCAL_TIME"
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 32
  BYTES         = 15
  FORMAT        = "I15"
  DESCRIPTION   = "Measurement start time. SESAME local time
                  (SLT) runs with a resolution of 1/32 seconds.
                  SLT represents the least significant 32 bits
                  of LOBT. The most significant 5 bits are in
                  CDMS RSST (see SESAME Ready Message)"
END_OBJECT

OBJECT          = COLUMN
  NAME          = "SENSOR_SETTINGS_USED"
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 48
  BYTES         = 7
  UNIT          = "N/A"
  DESCRIPTION   = "Used electrode combination as 3-digit
                  hexadecimal code 16#abi# with the
                  following meaning:
                  a: electrode connected to the TX A output.
                     Possible values:
                       0 [none],
                       1 [+X leg],
                       2 [MUPUS PEN]
                  b: electrode connected to the TX B output.
                     Possible values:
                       0 [none],
                       2 [MUPUS PEN],
                       3 [APX]
                  i: input channel
                     Possible values:
```

- 0 [potential difference]
- 1 [current at +X leg]
- 2 [current at MUPUS PEN]
- 3 [current at APX]
- 4 [direct measurement at +Y foot]
- 5 [direct measurement at - foot]
- 6 [reference voltage -2.5 V]
- 7 [reference voltage +2.5 V] "

END\_OBJECT = COLUMN

OBJECT = COLUMN

NAME = "NOMINAL\_FREQUENCY"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 56  
BYTES = 5  
UNIT = "HZ"  
FORMAT = "I5"  
DESCRIPTION = "Nominal transmitter frequency"

END\_OBJECT = COLUMN

OBJECT = COLUMN

NAME = "CORRECTED\_FREQUENCY"  
DATA\_TYPE = ASCII\_REAL  
START\_BYTE = 62  
BYTES = 8  
UNIT = "HZ"  
FORMAT = "F8.2"  
DESCRIPTION = "Corrected transmitter frequency"

END\_OBJECT = COLUMN

OBJECT = COLUMN

NAME = "NUMBER\_OF WAVES"  
DATA\_TYPE = ASCII\_INTEGER  
START\_BYTE = 71  
BYTES = 2  
UNIT = "N/A"  
FORMAT = "I2"  
DESCRIPTION = "Number of generated transmitter sine waves"

END\_OBJECT = COLUMN

OBJECT = COLUMN

NAME = "RX\_SAMPLING\_FREQUENCY"  
DATA\_TYPE = ASCII\_REAL  
START\_BYTE = 74  
BYTES = 8  
UNIT = "HZ"  
FORMAT = "F8.1"  
DESCRIPTION = "Receiver sampling frequency"

END\_OBJECT = COLUMN

OBJECT = COLUMN

NAME = "RX\_SAMPLING\_FREQUENCY"  
DATA\_TYPE = ASCII\_REAL

```
START_BYTE      = 83
BYTES           = 8
UNIT            = "HZ"
FORMAT          = "F8.1"
DESCRIPTION     = "Transmitter DAC sampling frequency"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
NAME            = "NO_OF_DAC_VALUES"
DATA_TYPE       = ASCII_INTEGER
START_BYTE     = 92
BYTES          = 3
UNIT           = "N/A"
FORMAT         = "I3"
DESCRIPTION    = "DAC vector length"
END_OBJECT     = COLUMN

OBJECT          = COLUMN
NAME            = "TX_OUT_DAMPING"
DATA_TYPE       = ASCII_INTEGER
START_BYTE     = 96
BYTES          = 1
UNIT           = "N/A"
FORMAT         = "I1"
DESCRIPTION    = "TX Voltage Amplitude Reduction.
                  The possible values are:
                  0 maximum amplitude.
                  1 half amplitude.
                  2 quarter amplitude.
                  3 1/8 amplitude.
                  4 1/16 amplitude."
END_OBJECT     = COLUMN

OBJECT          = COLUMN
NAME            = "POINTS_PER_WAVE"
DATA_TYPE       = ASCII_INTEGER
START_BYTE     = 98
BYTES          = 3
UNIT           = "N/A"
FORMAT         = "I3"
MISSING_CONSTANT = 999
DESCRIPTION    = "Number of points per wave used by receiver "
END_OBJECT     = COLUMN
```

The DAC table is identical to the FM1 version and is described by the following TABLE object.

```
OBJECT          = AMT_DACC_TABLE
NAME            = AMTESTDACC
INTERCHANGE_FORMAT = ASCII
ROWS            = 256
COLUMNS        = 5
ROW_BYTES       = 65
^STRUCTURE     = "PP_AMT_DACC.FMT"
```

END\_OBJECT = AMT\_DACC\_TABLE

The structure of the DAC table is described in the file PP\_AMT\_DACC.FMT.

/\* PP AMTEST / AMTEST2 DAC table entry, version 2, 2015-11-14 \*/

```
OBJECT = COLUMN
  NAME = "SESAME_SEQ_ID"
  DATA_TYPE = ASCII_INTEGER
  START_BYTE = 1
  BYTES = 6
  UNIT = "N/A"
  FORMAT = "I6"
  DESCRIPTION = "Sequence ID in the current data file"
END_OBJECT = COLUMN
```

```
OBJECT = COLUMN
  NAME = "UTC"
  DATA_TYPE = TIME
  START_BYTE = 8
  BYTES = 23
  DESCRIPTION = "Measurement start time (UTC in PDS standard
  format YYYY-MM-DDThh:mm:ss.sss)"
END_OBJECT = COLUMN
```

```
OBJECT = COLUMN
  NAME = "SESAME_LOCAL_TIME"
  DATA_TYPE = ASCII_INTEGER
  START_BYTE = 32
  BYTES = 15
  FORMAT = "I15"
  DESCRIPTION = "Measurement start time. SESAME local time
  (SLT) runs with a resolution of 1/32 seconds.
  SLT represents the least significant 32 bits
  of LOBT. The most significant 5 bits are in
  CDMS RSST (see SESAME Ready Message)"
END_OBJECT = COLUMN
```

```
OBJECT = COLUMN
  NAME = "DAC_TIME_OFFSET"
  DATA_TYPE = ASCII_REAL
  START_BYTE = 48
  BYTES = 7
  UNIT = "MILLISECOND"
  FORMAT = "F7.3"
  DESCRIPTION = "DAC time offset from start of wave"
END_OBJECT = COLUMN
```

```
OBJECT = COLUMN
  NAME = "DAC_VOLTAGE"
  DATA_TYPE = ASCII_REAL
  START_BYTE = 56
  BYTES = 7
```



```
UNIT          = "VOLT"  
FORMAT        = "F7.3"  
DESCRIPTION    = "Transmitter electrode difference voltage "  
END_OBJECT    = COLUMN
```

The receiver time series is identical to the FM1 version and is described by the following TABLE object.

```
OBJECT        = AMT_RXC_TABLE  
NAME          = AMTESTRXC  
INTERCHANGE_FORMAT = ASCII  
ROWS         = 8192  
COLUMNS     = 5  
ROW_BYTES    = 67  
^STRUCTURE   = "PP_AMT_RXC.FMT"  
END_OBJECT    = AMT_RXC_TABLE
```

The structure of the receiver time series table is described in the file PP\_AMT\_RXC.FMT.

```
OBJECT        = COLUMN  
NAME          = "SESAME_SEQ_ID"  
DATA_TYPE    = ASCII_INTEGER  
START_BYTE   = 1  
BYTES        = 6  
UNIT         = "N/A"  
FORMAT       = "I6"  
DESCRIPTION  = "Sequence ID in the current data file"  
END_OBJECT    = COLUMN
```

```
OBJECT        = COLUMN  
NAME          = "UTC"  
DATA_TYPE    = TIME  
START_BYTE   = 8  
BYTES        = 23  
DESCRIPTION  = "Measurement start time (UTC in PDS standard  
                format YYYY-MM-DDThh:mm:ss.sss)"  
END_OBJECT    = COLUMN
```

```
OBJECT        = COLUMN  
NAME          = "SESAME_LOCAL_TIME"  
DATA_TYPE    = ASCII_INTEGER  
START_BYTE   = 32  
BYTES        = 15  
FORMAT       = "I15"  
DESCRIPTION  = "Measurement start time. SESAME local time  
                (SLT) runs with a resolution of 1/32 seconds.  
                SLT represents the least significant 32 bits  
                of LOBT. The most significant 5 bits are in  
                CDMS RSST (see SESAME Ready Message)"  
END_OBJECT    = COLUMN
```

```
OBJECT        = COLUMN  
NAME          = "RX_TIME "
```

```
DATA_TYPE      = ASCII_REAL
START_BYTE     = 48
BYTES          = 8
UNIT           = "MILLISECOND"
FORMAT         = "F8.3"
DESCRIPTION    = "Relative to start time"
END_OBJECT     = COLUMN

OBJECT         = COLUMN
NAME           = "RX_POTENTIAL_DIFFERENCE"
DATA_TYPE     = ASCII_REAL
START_BYTE    = 57
BYTES         = 8
UNIT          = "VOLT"
FORMAT        = "F8.3"
DESCRIPTION   = "RX potential difference "
END_OBJECT    = COLUMN
```

The transmitter time series is identical to the FM1 version and is described by the following TABLE object.

```
OBJECT          = AMT_TX_TABLE
NAME            = AMT_TXC
INTERCHANGE_FORMAT = ASCII
ROWS           = 8192
COLUMNS       = 5
ROW_BYTES      = 68
^STRUCTURE     = "PP_AMT_TXC.FMT"
END_OBJECT     = AMT_TX_TABLE
```

The structure of the transmitter TABLE object is defined in the file PP\_AMT\_TXC.FMT.

```
/* PP AMTEST2 Tx table entry, version 2, 2015-11-14 */
```

```
OBJECT          = COLUMN
NAME            = "SESAME_SEQ_ID"
DATA_TYPE      = ASCII_INTEGER
START_BYTE     = 1
BYTES          = 6
UNIT           = "N/A"
FORMAT         = "I6"
DESCRIPTION    = "Sequence ID in the current data file"
END_OBJECT     = COLUMN

OBJECT          = COLUMN
NAME            = "UTC"
DATA_TYPE      = TIME
START_BYTE     = 8
BYTES          = 23
DESCRIPTION    = "Measurement start time (UTC in PDS standard
                  format YYYY-MM-DDThh:mm:ss.sss) "
END_OBJECT     = COLUMN
```

```
OBJECT = COLUMN
  NAME = "SESAME_LOCAL_TIME"
  DATA_TYPE = ASCII_INTEGER
  START_BYTE = 32
  BYTES = 15
  FORMAT = "I15"
  DESCRIPTION = "Measurement start time. SESAME local time
(SLT) runs with a resolution of 1/32 seconds.
SLT represents the least significant 32 bits
of LOBT. The most significant 5 bits are in
CDMS RSST (see SESAME Ready Message)"
END_OBJECT = COLUMN
```

```
OBJECT = COLUMN
  NAME = "TX_TIME "
  DATA_TYPE = ASCII_REAL
  START_BYTE = 48
  BYTES = 8
  UNIT = "MILLISECOND"
  FORMAT = "F8.3"
  DESCRIPTION = "Relative to start time"
END_OBJECT = COLUMN
```

```
OBJECT = COLUMN
  NAME = "TX_CURRENT"
  DATA_TYPE = ASCII_REAL
  START_BYTE = 57
  BYTES = 9
  UNIT = "MILLIAMPERE"
  FORMAT = "F9.6"
  DESCRIPTION = "Tx current at electronics' transmitter output "
END_OBJECT = COLUMN
```

#### 4.3.3.4.3.2 PP Health Check (HC) data

Same as FM1

#### 4.3.3.4.3.3 PP Langmuir Probe Test (LM) data

Same as FM1

#### 4.3.3.4.3.4 PP Passive Mode (PM) data

The PP PM data are organized as tables containing parameters and power spectra. The tables are kept in separate data files (combined detached labels). Consequently there will be one PDS label pointing to two data files.

Following is an example of PDS files corresponding to a PM measurement.

```
SES_FS3_PPM_070929214512_PM.LBL (label)
SES_FS3_PPM_070929214512_PAR.TAB (parameters)
SES_FS3_PPM_070929214512_POW.TAB (power spectrum)
```

The parameters are described by the following TABLE object.

```
OBJECT = PM2_PAR_TABLE
  NAME = PM2PAR
```

```
INTERCHANGE_FORMAT = ASCII
ROWS                = 1
COLUMNS            = 11
ROW_BYTES           = 115
^STRUCTURE          = "PP_PM2_PARC.FMT"
END_OBJECT          = PM2_PAR_TABLE
```

The structure of the parameters TABLE object is described in the file PP\_PM2\_PARC.FMT.

```
OBJECT              = COLUMN
  NAME               = "SESAME_SEQ_ID"
  DATA_TYPE         = ASCII_INTEGER
  START_BYTE         = 1
  BYTES              = 6
  UNIT               = "N/A"
  FORMAT             = "I6"
  DESCRIPTION        = "Sequence ID in the current data file"
END_OBJECT          = COLUMN
```

```
OBJECT              = COLUMN
  NAME               = "UTC"
  DATA_TYPE         = TIME
  START_BYTE         = 8
  BYTES              = 23
  DESCRIPTION        = "Measurement start time (UTC in PDS standard
                        format YYYY-MM-DDThh:mm:ss.sss)"
END_OBJECT          = COLUMN
```

```
OBJECT              = COLUMN
  NAME               = "SESAME_LOCAL_TIME"
  DATA_TYPE         = ASCII_INTEGER
  START_BYTE         = 32
  BYTES              = 15
  FORMAT             = "I15"
  DESCRIPTION        = "Measurement start time. SESAME local time
                        (SLT) runs with a resolution of 1/32 seconds.
                        SLT represents the least significant 32 bits
                        of LOBT. The most significant 5 bits are in
                        CDMS RSST (see SESAME Ready Message)"
END_OBJECT          = COLUMN
```

```
OBJECT              = COLUMN
  NAME               = "LP_INT_INC"
  DATA_TYPE         = ASCII_REAL
  START_BYTE         = 48
  BYTES              = 9
  UNIT               = "SECOND"
  FORMAT             = "F9.7"
  DESCRIPTION        = "Time increment duration per integrator unit "
END_OBJECT          = COLUMN
```

```
OBJECT              = COLUMN
  NAME               = "LP_VALUE"
```

---

```
DATA_TYPE           = ASCII_REAL
START_BYTE          = 58
BYTES               = 9
UNIT                = "SECOND"
FORMAT              = "F9.7"
DESCRIPTION         = "Integration time of Langmuir probe measurement "
END_OBJECT          = COLUMN

OBJECT              = COLUMN
NAME                = "LP_MEAS_ERR"
DATA_TYPE           = ASCII_INTEGER
START_BYTE          = 68
BYTES               = 8
UNIT                = "N/A"
MISSING_CONSTANT    = 16#0000#
DESCRIPTION         = "Error code for LP measurement as
                        Hex value 16#xxxx#. The possible values are:
                        8001 Invalid register address.
                        8002 Error verifying register write.
                        8004 Error accessing power register.
                        8008 MUX setting not allowed.
                        8010 Error accessing PP RAM.
                        8020 Tried to start measurement but a measurement
                              is already running.
                        0040 Error during writing to instrument.
                        0080 Error during reading from instrument.
                        0100 Error using ADC of C-DPU.
                        0200 Error during DAC table generation.
                        0400 Calculated number of samples > N_SAMP_MAX.
                        8800 C-DPU memory exhausted.
                        9000 Measurement time out.
                        2000 Invalid command parameter.
                        8000 Flag indicates fatal error. "
END_OBJECT          = COLUMN

OBJECT              = COLUMN
NAME                = "TIME_INC"
DATA_TYPE           = ASCII_REAL
START_BYTE          = 77
BYTES               = 9
UNIT                = "SECOND"
FORMAT              = "F9.7"
DESCRIPTION         = "Time increment between samples"
END_OBJECT          = COLUMN

OBJECT              = COLUMN
NAME                = "NB_SAMPLES"
DATA_TYPE           = ASCII_INTEGER
START_BYTE          = 87
BYTES               = 5
UNIT                = "N/A"
FORMAT              = "I5"
DESCRIPTION         = "Number of used samples (excluding skipped samples) "
```

---

```
END_OBJECT          = COLUMN

OBJECT              = COLUMN
  NAME               = "ERROR_CODE"
  DATA_TYPE         = ASCII_INTEGER
  START_BYTE        = 93
  BYTES              = 8
  UNIT               = "N/A"
  MISSING_CONSTANT  = 16#0000#
  DESCRIPTION        = "Hex value AS 16#XXXX#. The possible values are:
                        8001 Invalid register address.
                        8002 Error verifying register write.
                        8004 Error accessing power register.
                        8008 MUX setting not allowed.
                        8010 Error accessing PP RAM.
                        8020 Tried to start measurement but a measurement
                              is already running.
                        0040 Error during writing to instrument.
                        0080 Error during reading from instrument.
                        0100 Error using ADC of C-DPU.
                        0200 Error during DAC table generation.
                        0400 Calculated number of samples > N_SAMP_MAX.
                        8800 C-DPU memory exhausted.
                        9000 Measurement time out.
                        2000 Invalid command parameter.
                        8000 Flag indicates fatal error. "
```

```
END_OBJECT          = COLUMN

OBJECT              = COLUMN
  NAME               = "NB_FREQ_BINS"
  DATA_TYPE         = ASCII_INTEGER
  START_BYTE        = 102
  BYTES              = 2
  UNIT               = "N/A"
  FORMAT             = "I2"
  DESCRIPTION        = "Number of frequency bins "
```

```
END_OBJECT          = COLUMN

OBJECT              = COLUMN
  NAME               = "MATH_ERR_CODE"
  DATA_TYPE         = ASCII_INTEGER
  START_BYTE        = 105
  BYTES              = 8
  UNIT               = "N/A"
  MISSING_CONSTANT  = 16#0000#
  DESCRIPTION        = "Indicates errors, which can only occur during
                        on-board data reduction (hex value).
                        0001 Reduce: number of vector elements odd or less
                              than 2; fatal.
                        0002 Expand: less than four elements in input
                              vector; fatal.
                        0004 Too much data for analysis; truncating.
                        0008 Too few data for analysis; padding with '128'
```

```

0010 Used number of waves is not a power of 2;
      truncated.
0020 Not the expected number of elements in
      filtered arrays; fatal.
0040 Argument for sine_table() not in valid range
      0<= deg2 <=720.
0080 Overflow in divsin() or result inexact.
0100 Too few data for trimmed mean calculation;
      regular mean used.
0200 No data for warr.mean; particular: analysis
      yields no data.
0400 Passive mode: not enough data in bin.
0800 Not enough memory for data reduction."
  
```

```
END_OBJECT          = COLUMN
```

The power spectrum is described by the following TABLE object.

```

OBJECT              = PM2_POWC_TABLE
NAME                = PM2_POWC
INTERCHANGE_FORMAT = ASCII
ROWS                = 10
COLUMNS            = 5
ROW_BYTES           = 68
^STRUCTURE          = "PP_PM2_POWC.FMT"
END_OBJECT          = PM2_POWC_TABLE
  
```

The structure of the power spectrum TABLE object is described in the file PP\_PM2\_POWC.FMT

```
/* PP calibrated power values, version 2, 2015-11-14 */
```

```

OBJECT              = COLUMN
NAME                = "SESAME_SEQ_ID"
DATA_TYPE           = ASCII_INTEGER
START_BYTE          = 1
BYTES               = 6
UNIT                = "N/A"
FORMAT              = "I6"
DESCRIPTION          = "Sequence ID in the current data file"
END_OBJECT          = COLUMN
  
```

```

OBJECT              = COLUMN
NAME                = "UTC"
DATA_TYPE           = TIME
START_BYTE          = 8
BYTES               = 23
DESCRIPTION          = "Measurement start time (UTC in PDS standard
                        format YYYY-MM-DDThh:mm:ss.sss)"
END_OBJECT          = COLUMN
  
```

```

OBJECT              = COLUMN
NAME                = "SESAME_LOCAL_TIME"
DATA_TYPE           = ASCII_INTEGER
START_BYTE          = 32
  
```

```

  BYTES          = 15
  FORMAT         = "I15"
  DESCRIPTION    = "Measurement start time. SESAME local time
(SLT) runs with a resolution of 1/32 seconds.
  SLT represents the least significant 32 bits
of LOBT. The most significant 5 bits are in
  CDMS RSST (see SESAME Ready Message)"
END_OBJECT      = COLUMN
  
```

```

OBJECT          = COLUMN
  NAME          = "CENTER_FREQ"
  DATA_TYPE    = ASCII_REAL
  START_BYTE    = 48
  BYTES         = 7
  FORMAT        = "F7.1"
  UNIT          = "Hz"
  DESCRIPTION   = "Frequency bins Center Frequency +/- 1/3"
END_OBJECT      = COLUMN
  
```

```

OBJECT          = COLUMN
  NAME          = "VOLTAGE_DENSITY"
  DATA_TYPE    = ASCII_REAL
  START_BYTE    = 56
  BYTES         = 10
  FORMAT        = "F10.2"
  UNIT          = "<mV*(Hz**-1/2)>"
  DESCRIPTION   = "Voltage Density"
END_OBJECT      = COLUMN
  
```

#### 4.3.3.4.3.5 PP Passive Mode Test (PMTEST) data

The PP PMTEST2 data are organized as tables containing parameters, power spectra and receiver (Rx) time series. The tables are kept in separate data files (combined detached labels). Consequently there will be one PDS label pointing to three data files.

Following is an example of PDS files corresponding to an PMTEST measurement.

- SES\_FS3\_PPM\_070929214512\_TEST.LBL** (label)
- SES\_FS3\_PPM\_070929214512\_TPAR.TAB (parameters)
- SES\_FS3\_PPM\_070929214512\_TPOW.TAB (power spectrum)
- SES\_FS3\_PPM\_070929214512\_TRX.TAB (receiver time series)

The parameters are described by the following TABLE object.

```

OBJECT          = PMT2_PARC_TABLE
  NAME          = PMT2_PARC
  INTERCHANGE_FORMAT = ASCII
  ROWS          = 1
  COLUMNS      = 11
  ROW_BYTES     = 115
  ^STRUCTURE    = "PP_PMT2_PACR.FMT"
END_OBJECT      = PMT2_PARC_TABLE
  
```

The structure of the parameters TABLE object is described in the file PP\_PMT2\_PARC.FMT.



/\* PP PM2 calibrated parameters, version 2, 2015-11-14 \*/

```

OBJECT          = COLUMN
  NAME          = "SESAME_SEQ_ID"
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 1
  BYTES         = 6
  UNIT          = "N/A"
  FORMAT        = "I6"
  DESCRIPTION   = "Sequence ID in the current data file"
END_OBJECT

OBJECT          = COLUMN
  NAME          = "UTC"
  DATA_TYPE    = TIME
  START_BYTE    = 8
  BYTES         = 23
  DESCRIPTION   = "Measurement start time (UTC in PDS standard
                  format YYYY-MM-DDThh:mm:ss.sss)"
END_OBJECT

OBJECT          = COLUMN
  NAME          = "SESAME_LOCAL_TIME"
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 32
  BYTES         = 15
  FORMAT        = "I15"
  DESCRIPTION   = "Measurement start time. SESAME local time
                  (SLT) runs with a resolution of 1/32 seconds.
                  SLT represents the least significant 32 bits
                  of LOBT. The most significant 5 bits are in
                  CDMS RSST (see SESAME Ready Message)"
END_OBJECT

OBJECT          = COLUMN
  NAME          = "LP_INT_INC"
  DATA_TYPE    = ASCII_REAL
  START_BYTE    = 48
  BYTES         = 9
  UNIT          = "SECOND"
  FORMAT        = "F9.7"
  DESCRIPTION   = "Time increment duration per integrator unit "
END_OBJECT

OBJECT          = COLUMN
  NAME          = "LP_VALUE"
  DATA_TYPE    = ASCII_REAL
  START_BYTE    = 58
  BYTES         = 9
  UNIT          = "SECOND"
  FORMAT        = "F9.7"
  DESCRIPTION   = "Integration time of Langmuir probe measurement "
END_OBJECT
  
```

```
OBJECT = COLUMN
  NAME = "LP_MEAS_ERR"
  DATA_TYPE = ASCII_INTEGER
  START_BYTE = 68
  BYTES = 8
  UNIT = "N/A"
  MISSING_CONSTANT = 16#0000#
  DESCRIPTION = "Error code for LP measurement.
    Hex value as 16#xxxx#. The possible values are:
    8001 Invalid register address.
    8002 Error verifying register write.
    8004 Error accessing power register.
    8008 MUX setting not allowed.
    8010 Error accessing PP RAM.
    8020 Tried to start measurement but a measurement
        is already running.
    0040 Error during writing to instrument.
    0080 Error during reading from instrument.
    0100 Error using ADC of C-DPU.
    0200 Error during DAC table generation.
    0400 Calculated number of samples > N_SAMP_MAX.
    8800 C-DPU memory exhausted.
    9000 Measurement time out.
    2000 Invalid command parameter.
    8000 Flag indicates fatal error. "
```

```
END_OBJECT = COLUMN
```

```
OBJECT = COLUMN
  NAME = "TIME_INC"
  DATA_TYPE = ASCII_REAL
  START_BYTE = 77
  BYTES = 9
  UNIT = "SECOND"
  FORMAT = "F9.7"
  DESCRIPTION = "Time increment between samples"
```

```
END_OBJECT = COLUMN
```

```
OBJECT = COLUMN
  NAME = "NB_SAMPLES"
  DATA_TYPE = ASCII_INTEGER
  START_BYTE = 87
  BYTES = 5
  UNIT = "N/A"
  FORMAT = "I5"
  DESCRIPTION = "Number of used samples (excluding skipped samples) "
```

```
END_OBJECT = COLUMN
```

```
OBJECT = COLUMN
  NAME = "ERROR_CODE"
  DATA_TYPE = ASCII_INTEGER
  START_BYTE = 93
  BYTES = 8
```

---

```
UNIT = "N/A"
MISSING_CONSTANT = 16#0000#
DESCRIPTION = "Hex value as 16#xxxx#. The possible values are:
      8001 Invalid register address.
      8002 Error verifying register write.
      8004 Error accessing power register.
      8008 MUX setting not allowed.
      8010 Error accessing PP RAM.
      8020 Tried to start measurement but a measurement
            is already running.
      0040 Error during writing to instrument.
      0080 Error during reading from instrument.
      0100 Error using ADC of C-DPU.
      0200 Error during DAC table generation.
      0400 Calculated number of samples > N_SAMP_MAX.
      8800 C-DPU memory exhausted.
      9000 Measurement time out.
      2000 Invalid command parameter.
      8000 Flag indicates fatal error. "
```

```
END_OBJECT = COLUMN
```

```
OBJECT = COLUMN
  NAME = "NB_FREQ_BINS"
  DATA_TYPE = ASCII_INTEGER
  START_BYTE = 102
  BYTES = 2
  UNIT = "N/A"
  FORMAT = "I2"
  DESCRIPTION = "Number of frequency bins "
```

```
END_OBJECT = COLUMN
```

```
OBJECT = COLUMN
  NAME = "MATH_ERR_CODE"
  DATA_TYPE = ASCII_INTEGER
  START_BYTE = 105
  BYTES = 8
  UNIT = "N/A"
  MISSING_CONSTANT = 16#0000#
  DESCRIPTION = "Indicates errors, which can only occur during
on-board data reduction (hex value as 16#xxxx#).
      0001 Reduce: number of vector elements odd or less
            than 2; fatal.
      0002 Expand: less than four elements in input
            vector; fatal.
      0004 Too much data for analysis; truncating.
      0008 Too few data for analysis; padding with '128'
      0010 Used number of waves is not a power of 2;
            truncated.
      0020 Not the expected number of elements in
            filtered arrays; fatal.
      0040 Argument for sine_table() not in valid range
            0<= deg2 <=720.
      0080 Overflow in divsin() or result inexact.
```

```

0100 Too few data for trimmed mean calculation;
      regular mean used.
0200 No data for warr.mean; particular: analysis
      yields no data.
0400 Passive mode: not enough data in bin.
0800 Not enough memory for data reduction."
END_OBJECT          = COLUMN
  
```

The calibrated power spectrum is described by the following TABLE object.

```

OBJECT              = PMT2_POWC_TABLE
NAME                = PMT2_POWC
INTERCHANGE_FORMAT = ASCII
ROWS                = 10
COLUMNS            = 5
ROW_BYTES           = 68
^STRUCTURE          = "PP_PM2_POWC.FMT"
END_OBJECT          = PMT2_POWC_TABLE
  
```

The structure of the power TABLE object is identical to PM2C and is described in the file PP\_PM2\_POWC.FMT

```
/* PP calibrated power values, version 2, 2015-11-14 */
```

```

OBJECT              = COLUMN
NAME                = "SESAME_SEQ_ID"
DATA_TYPE           = ASCII_INTEGER
START_BYTE          = 1
BYTES               = 6
UNIT                = "N/A"
FORMAT              = "I6"
DESCRIPTION          = "Sequence ID in the current data file"
END_OBJECT          = COLUMN
  
```

```

OBJECT              = COLUMN
NAME                = "UTC"
DATA_TYPE           = TIME
START_BYTE          = 8
BYTES               = 23
DESCRIPTION          = "Measurement start time (UTC in PDS standard
      format YYYY-MM-DDThh:mm:ss.sss) "
END_OBJECT          = COLUMN
  
```

```

OBJECT              = COLUMN
NAME                = "SESAME_LOCAL_TIME"
DATA_TYPE           = ASCII_INTEGER
START_BYTE          = 32
BYTES               = 15
FORMAT              = "I15"
DESCRIPTION          = "Measurement start time. SESAME local time
      (SLT) runs with a resolution of 1/32 seconds.
      SLT represents the least significant 32 bits
      of LOBT. The most significant 5 bits are in
  
```

```

    CDMS RSST (see SESAME Ready Message)"
END_OBJECT      = COLUMN

OBJECT          = COLUMN
  NAME          = "CENTER_FREQ"
  DATA_TYPE    = ASCII_REAL
  START_BYTE    = 48
  BYTES         = 7
  FORMAT        = "F7.1"
  UNIT          = "Hz"
  DESCRIPTION   = "Frequency bins Center Frequency +/- 1/3"
END_OBJECT      = COLUMN
  
```

```

OBJECT          = COLUMN
  NAME          = "VOLTAGE_DENSITY"
  DATA_TYPE    = ASCII_REAL
  START_BYTE    = 56
  BYTES         = 10
  FORMAT        = "F10.2"
  UNIT          = "<mV*(Hz**(-1/2))>"
  DESCRIPTION   = "Voltage Density"
END_OBJECT      = COLUMN
  
```

The receiver data are described by the following TABLE object.

```

OBJECT          = PMT2RXC_TABLE
  NAME          = PM2TRXC
  INTERCHANGE_FORMAT = ASCII
  ROWS          = 8192
  COLUMNS      = 5
  ROW_BYTES     = 66
  ^STRUCTURE    = "PP_PMT2_RXC.FMT"
END_OBJECT      = PMT2RX_TABLE
  
```

The structure of the receiver data TABLE object is described in the file PP\_PMT2\_RXC.FMT.

/\* PP AMTEST2 Calibrated Rx table entry, version 2, 2015-11-14 \*/

```

OBJECT          = COLUMN
  NAME          = "SESAME_SEQ_ID"
  DATA_TYPE    = ASCII_INTEGER
  START_BYTE    = 1
  BYTES         = 6
  UNIT          = "N/A"
  FORMAT        = "I6"
  DESCRIPTION   = "Sequence ID in the current data file"
END_OBJECT      = COLUMN
  
```

```

OBJECT          = COLUMN
  NAME          = "UTC"
  DATA_TYPE    = TIME
  START_BYTE    = 8
  BYTES         = 23
  
```

---

DESCRIPTION = "Measurement start time (UTC in PDS standard  
format YYYY-MM-DDThh:mm:ss.sss)"

END\_OBJECT = COLUMN

OBJECT = COLUMN

NAME = "SESAME\_LOCAL\_TIME"

DATA\_TYPE = ASCII\_INTEGER

START\_BYTE = 32

BYTES = 15

FORMAT = "I15"

DESCRIPTION = "Measurement start time. SESAME local time  
(SLT) runs with a resolution of 1/32 seconds.  
SLT represents the least significant 32 bits  
of LOBT. The most significant 5 bits are in  
CDMS RSST (see SESAME Ready Message)"

END\_OBJECT = COLUMN

OBJECT = COLUMN

NAME = "TIME\_OFFSET "

DATA\_TYPE = ASCII\_REAL

START\_BYTE = 48

BYTES = 7

UNIT = "MILLISECOND"

FORMAT = "F7.3"

DESCRIPTION = "Time offset from first sample"

END\_OBJECT = COLUMN

OBJECT = COLUMN

NAME = "POTENTIAL\_DIFF"

DATA\_TYPE = ASCII\_REAL

START\_BYTE = 56

BYTES = 8

UNIT = "MILLIVOLT"

FORMAT = "F8.3"

DESCRIPTION = "Potential Difference between +Y and -Y foot "

END\_OBJECT = COLUMN

#### 4.3.3.4.4 SESAME common data object definition

Same as level 2 (see §4.3.2.7.5).

#### 4.3.3.5 Description of Instrument

The description of the instrument can be found in chapter 2.2 and as a brief overview in the INST.CAT catalogue file.

#### 4.3.3.6 Parameters Index File Definition

N/A

#### 4.3.3.7 Mission Specific Keywords

N/A

#### 4.3.3.8 Data quality definition (level 3)

##### 4.3.3.8.1 CASSE

Same definition as for level 2 (see §4.3.2.7.1)

#### 4.3.3.8.2 DIM

Same definition as for level 2 (see 4.3.2.7.2)

#### 4.3.3.8.3 PP

The DATA\_QUALITY\_ID for PP is defined according to the operating mode as follows.

##### 4.3.3.8.3.1 PP Health Check

DATA\_QUALITY\_DESC = -1: NOT QUALIFIED

0: Data complete; no errors

1: At least one value is replaced by placeholder due to distorted raw data  
(= "0" or "255")

2: N/A

3: N/A

4: N/A

##### 4.3.3.8.3.2 PP Active Mode and Active Mode Test (PP\_AM2, PP\_AMTEST2)

DATA\_QUALITY\_DESC = -1: NOT QUALIFIED

0: Data complete; no errors

1: <50% QUAL-flags = 0x0F, a few errors

2: 50% to 100% QUAL-flags = 0x0F, many errors

3: N/A

4: N/A

##### 4.3.3.8.3.3 PP Passive Mode and Passive Mode Test (PP\_PM2, PP\_PMTEST2)

DATA\_QUALITY\_DESC = -1: NOT QUALIFIED

0: Data complete; no errors

1: Data distorted; level 2: ID = "1"

2: N/A

3: N/A

4: N/A

#### 4.3.3.8.4 SESAME Health-Check

Same definition as for level 2 (see § 4.3.2.7.4)

## 5 Appendix

### 5.1 SESAME and PDS Glossary

**Archive** – An archive consists of one or more data sets along with all the documentation and ancillary information needed to understand and use the data. An archive is a logical construct independent of the medium on which it is stored.

**Archive Volume, Archive Volume Set** – A volume is a unit of media on which data products are stored; for example, one CD-ROM or DVD-ROM. An *archive volume* is a volume containing all or part of an archive; that is, data products plus documentation and ancillary files. When an archive spans multiple volumes, they are called an *archive volume set*. Usually the documentation and some ancillary files are repeated on each volume of the set, so that a single volume can be used alone.

**Catalog Information** – Descriptive information about a data set (e.g. mission description, spacecraft description, instrument description), expressed in Object Description Language (ODL), which is suitable for loading into a PDS catalog.

**Central Electronics (CE)** - Complete SESAME electronics in E-Box: *Common Electronics* and the 3 instrument PCBs

**Common Electronics** - Common SESAME electronics in E-Box: Interface board, Common DPU and SESAME Experiment bus.

**Data Product** – A labeled grouping of data resulting from a scientific observation, usually stored in one file. A product label identifies, describes, and defines the structure of the data. An example of a data product is a planetary image, a spectrum table, or a time series table.

**Data Set** – An accumulation of data products. A data set together with supporting documentation and ancillary files is an archive.

**E-Box** - Common container for the PCBs of most ROSETTA Lander sub-units and experiments

**Experiment** - The SESAME experiment set-up, consisting of Common Electronics and the three instruments (CASSE, DIM and PP)

**Health-Check** - Procedure to check the status of a SESAME instrument by dedicated tests, calibrations, and measurements of health-relevant parameters. Health-Checks are solely controlled by the Common DPU. The time duration of health data acquisition is not critical. The whole parameter set may be determined in one cycle within milliseconds or more. The resulting parameter values are fed into the science data stream.

**Housekeeping** - Procedure to check the status of a SESAME instrument by periodic calls of the CDMS, asking SESAME to read out single health-relevant key parameters in a pre-defined cycle. The resulting parameter value is delivered to the CDMS and included in the Lander housekeeping data stream.

A subset of the SESAME housekeeping parameters is extracted by the CDMS to form part of the Lander "Health Status Report" provided for Mission Control. The set of housekeeping parameters form a subset of the health-check parameters.

**Instrument** - The SESAME sub-units CASSE, DIM and PP, each with its own sensor / actuator assembly, the harness and a PCB within the *Central Electronics* (CE).

**Jobcard, Job Card** - Data structure of 32 byte length, especially developed for the CASSE instrument to completely control a CASSE measurement. A CASSE *Jobcard* contains all necessary parameter values (e.g. sampling frequency, "ping" frequency and duration, etc.) defining the complete performance of a measurement.



## 5.2 Example of PDS label for CASSE level 2 data product

```

PDS_VERSION_ID          = PDS3
LABEL_REVISION_NOTE    = "2017-02-13, SONC, version 1.0"

/* Edited SC data from CASSE Sounding Mode (SONC Level 2) */

DATA_SET_ID            = "RL-C-SESAME-2-FSS-V1.0"
DATA_SET_NAME          = "ROSETTA-LANDER 67P SESAME 2 FSS V1.0"
PRODUCT_ID             = "SES_FS2_CSN_1411140016"
PRODUCT_CREATION_TIME  = 2017-02-13T17:41:41
MISSION_NAME           = "INTERNATIONAL ROSETTA MISSION"
MISSION_PHASE_NAME     = "FIRST SCIENCE SEQUENCE"
MISSION_ID             = ROSETTA
INSTRUMENT_HOST_NAME   = "ROSETTA-LANDER"
INSTRUMENT_HOST_ID    = RL

PRODUCT_TYPE           = EDR
START_TIME             = 2014-11-14T00:16:05.068
STOP_TIME              = 2014-11-14T00:25:42.381
SPACECRAFT_CLOCK_START_COUNT = "3/374544893.26"
SPACECRAFT_CLOCK_STOP_COUNT  = "3/374545471.04"

PRODUCER_ID           = "SONC"
PRODUCER_FULL_NAME    = "SCIENCE OPERATIONS AND NAVIGATION CENTER"
PRODUCER_INSTITUTION_NAME = "CNES"

INSTRUMENT_ID         = SESAME
INSTRUMENT_NAME       = "SURFACE ELECTRIC SOUNDING AND
                        ACOUSTIC MONITORING EXPERIMENT"
INSTRUMENT_TYPE       = {"ACOUSTIC SENSOR", "DUST IMPACT DETECTOR",
                        "PERMITTIVITY PROBE"}
TARGET_NAME           = "67P/CHURYUMOV-GERASIMENKO 1 (1969 R1)"
TARGET_TYPE           = "COMET"

PROCESSING_LEVEL_ID   = "2"
DATA_QUALITY_ID       = "-1"
DATA_QUALITY_DESC     = "-1 : NOT QUALIFIED"

/* DATA OBJECT DEFINITION */

OBJECT                = FILE
RECORD_TYPE           = FIXED_LENGTH
RECORD_BYTES          = 176
FILE_RECORDS          = 2
^JOB_TABLE            = "SES_FS2_CSN_1411140016_JOB_TABLE"
OBJECT                = JOB_TABLE
NAME                  = "JOB_CARD"
INTERCHANGE_FORMAT    = ASCII
ROWS                  = 2
COLUMNS              = 29
ROW_BYTES             = 176
  
```

```

^STRUCTURE          = "CAS_JOB_CARD_FM3.FMT"
END_OBJECT          = JOBC_TABLE
END_OBJECT          = FILE

OBJECT              = FILE
RECORD_TYPE        = FIXED_LENGTH
RECORD_BYTES       = 189
FILE_RECORDS       = 2
^SEQ_PARAM_TABLE   = "SES_FS2_CSN_1411140016_SEQP.TAB"
OBJECT              = SEQ_PARAM_TABLE
NAME                = "SEQ_PARAM"
INTERCHANGE_FORMAT = ASCII
ROWS                = 2
COLUMNS           = 22
ROW_BYTES          = 189
^STRUCTURE          = "CAS_SEQ_PARAM_BURST2_FM3.FMT"
END_OBJECT          = SEQ_PARAM_TABLE
END_OBJECT          = FILE

OBJECT              = FILE
RECORD_TYPE        = FIXED_LENGTH
RECORD_BYTES       = 231
FILE_RECORDS       = 42144
^DATA_TABLE        = "SES_FS2_CSN_1411140016_DATA.TAB"
OBJECT              = DATA_TABLE
NAME                = "DATA"
INTERCHANGE_FORMAT = ASCII
ROWS                = 42144
COLUMNS           = 26
ROW_BYTES          = 231
^STRUCTURE          = "CAS_DATA2.FMT"
END_OBJECT          = DATA_TABLE
END_OBJECT          = FILE

OBJECT              = FILE
RECORD_TYPE        = FIXED_LENGTH
RECORD_BYTES       = 219
FILE_RECORDS       = 2
^STAT_TABLE        = "SES_FS2_CSN_1411140016_STAT.TAB"
OBJECT              = STAT_TABLE
NAME                = "STAT"
INTERCHANGE_FORMAT = ASCII
ROWS                = 2
COLUMNS           = 38
ROW_BYTES          = 219
^STRUCTURE          = "CAS_STAT2_FM3.FMT"
END_OBJECT          = STAT_TABLE
END_OBJECT          = FILE
  
```

END



```

^STRUCTURE          = "DIM_BC_PAR.FMT"
END_OBJECT          = BC_PAR_TABLE
END_OBJECT          = FILE

OBJECT              = FILE
RECORD_TYPE         = FIXED_LENGTH
RECORD_BYTES        = 16
FILE_RECORDS        = 60
^BC_AM_TABLE        = "SES_FS2_DBC_1411130702_AM.TAB"
OBJECT              = BC_AM_TABLE
NAME                 = "BC_AM"
INTERCHANGE_FORMAT = ASCII
ROWS                 = 60
COLUMNS             = 3
ROW_BYTES            = 16
^STRUCTURE          = "DIM_BC_AM.FMT"
END_OBJECT          = BC_AM_TABLE
END_OBJECT          = FILE

OBJECT              = FILE
RECORD_TYPE         = FIXED_LENGTH
RECORD_BYTES        = 318
FILE_RECORDS        = 540
^BC_BM_TABLE        = "SES_FS2_DBC_1411130702_BM.TAB"
OBJECT              = BC_BM_TABLE
NAME                 = "BC_BM"
INTERCHANGE_FORMAT = ASCII
ROWS                 = 540
COLUMNS             = 62
ROW_BYTES            = 318
^STRUCTURE          = "DIM_BC_BM.FMT"
END_OBJECT          = BC_BM_TABLE
END_OBJECT          = FILE

END
  
```

## 5.4 Example of PDS label for PP PM level 2 data product

```

PDS_VERSION_ID      = PDS3
LABEL_REVISION_NOTE = "2017-02-13, SONC, version 1.0"

/* Edited SC data from PP Passive Mode (SONC Level 2) */

DATA_SET_ID          = "RL-C-SESAME-2-FSS-V1.0"
DATA_SET_NAME        = "ROSETTA-LANDER 67P SESAME 2 FSS V1.0"
PRODUCT_ID           = "SES_FS2_PPM_1411130810"
PRODUCT_CREATION_TIME = 2017-02-13T17:41:35
MISSION_NAME         = "INTERNATIONAL ROSETTA MISSION"
MISSION_PHASE_NAME   = "FIRST SCIENCE SEQUENCE"
MISSION_ID           = ROSETTA
INSTRUMENT_HOST_NAME = "ROSETTA-LANDER"
INSTRUMENT_HOST_ID   = RL
  
```

```
PRODUCT_TYPE           = EDR
START_TIME             = 2014-11-13T08:10:28.554
STOP_TIME              = 2014-11-13T08:13:40.085
SPACECRAFT_CLOCK_START_COUNT = "3/374486957.10"
SPACECRAFT_CLOCK_STOP_COUNT  = "3/374487148.27"
```

```
PRODUCER_ID           = "SONC"
PRODUCER_FULL_NAME    = "SCIENCE OPERATIONS AND NAVIGATION CENTER"
PRODUCER_INSTITUTION_NAME = "CNES"
```

```
INSTRUMENT_ID        = SESAME
INSTRUMENT_NAME      = "SURFACE ELECTRIC SOUNDING AND
ACOUSTIC MONITORING EXPERIMENT"
INSTRUMENT_TYPE      = {"ACOUSTIC SENSOR", "DUST IMPACT DETECTOR",
"PERMITTIVITY PROBE"}
TARGET_NAME          = "67P/CHURYUMOV-GERASIMENKO 1 (1969 R1)"
TARGET_TYPE          = "COMET"
```

```
PROCESSING_LEVEL_ID  = "2"
DATA_QUALITY_ID      = "-1"
DATA_QUALITY_DESC    = "-1 : NOT QUALIFIED"
```

/\* DATA OBJECT DEFINITION \*/

```
OBJECT                = FILE
RECORD_TYPE           = FIXED_LENGTH
RECORD_BYTES          = 99
FILE_RECORDS          = 2
^PM_PAR_TABLE         = "SES_FS2_PPM_1411130810_PAR.TAB"
OBJECT                = PM_PAR_TABLE
NAME                  = "PM_PAR"
INTERCHANGE_FORMAT    = ASCII
ROWS                  = 2
COLUMNS              = 11
ROW_BYTES             = 99
^STRUCTURE            = "PP_PM2_PAR.FMT"
END_OBJECT            = PM_PAR_TABLE
END_OBJECT            = FILE
```

```
OBJECT                = FILE
RECORD_TYPE           = FIXED_LENGTH
RECORD_BYTES          = 62
FILE_RECORDS          = 20
^PM_POW_TABLE         = "SES_FS2_PPM_1411130810_POW.TAB"
OBJECT                = PM_POW_TABLE
NAME                  = "PM_POW"
INTERCHANGE_FORMAT    = ASCII
ROWS                  = 20
COLUMNS              = 5
ROW_BYTES             = 62
^STRUCTURE            = "PP_PM2_POW.FMT"
```

```
END_OBJECT          = PM_POW_TABLE
END_OBJECT          = FILE
```

END

## 5.5 Example of PDS label for CASSE level 3 data product

```
PDS_VERSION_ID      = PDS3
LABEL_REVISION_NOTE = "2017-02-13, SONC, version 1.0"

/* Edited SC data from CASSE Sounding Mode (SONC Level 3) */

DATA_SET_ID         = "RL-C-SESAME-3-FSS-V1.0"
DATA_SET_NAME       = "ROSETTA-LANDER 67P SESAME 3 FSS V1.0"
PRODUCT_ID          = "SES_FS3_CSN_1411140016"
PRODUCT_CREATION_TIME = 2017-02-13T17:42:29
MISSION_NAME        = "INTERNATIONAL ROSETTA MISSION"
MISSION_PHASE_NAME  = "FIRST SCIENCE SEQUENCE"
MISSION_ID          = ROSETTA
INSTRUMENT_HOST_NAME = "ROSETTA-LANDER"
INSTRUMENT_HOST_ID  = RL

PRODUCT_TYPE        = RDR
START_TIME          = 2014-11-14T00:16:05.068
STOP_TIME           = 2014-11-14T00:25:42.381
SPACECRAFT_CLOCK_START_COUNT = "3/374544893.26"
SPACECRAFT_CLOCK_STOP_COUNT  = "3/374545471.04"

PRODUCER_ID         = "SONC"
PRODUCER_FULL_NAME  = "SCIENCE OPERATIONS AND NAVIGATION CENTER"
PRODUCER_INSTITUTION_NAME = "CNES"

INSTRUMENT_ID       = SESAME
INSTRUMENT_NAME     = "SURFACE ELECTRIC SOUNDING AND
ACOUSTIC MONITORING EXPERIMENT"
INSTRUMENT_TYPE     = {"ACOUSTIC SENSOR", "DUST IMPACT DETECTOR",
"PERMITTIVITY PROBE"}
TARGET_NAME         = "67P/CHURYUMOV-GERASIMENKO 1 (1969 R1)"
TARGET_TYPE         = "COMET"

PROCESSING_LEVEL_ID = "3"
DATA_QUALITY_ID     = "-1"
DATA_QUALITY_DESC   = "-1 : NOT QUALIFIED"

/* DATA OBJECT DEFINITION */

OBJECT              = FILE
RECORD_TYPE         = FIXED_LENGTH
RECORD_BYTES        = 176
FILE_RECORDS        = 2
^JOB_TABLE          = "SES_FS3_CSN_1411140016_JOB_TABLE"
```

```
OBJECT                = JOBC_TABLE
  NAME                = "JOB_CARD"
  INTERCHANGE_FORMAT = ASCII
  ROWS                = 2
  COLUMNS            = 29
  ROW_BYTES           = 176
  ^STRUCTURE         = "CAS_JOB_CARD_FM3.FMT"
END_OBJECT            = JOBC_TABLE
END_OBJECT            = FILE
```

```
OBJECT                = FILE
  RECORD_TYPE         = FIXED_LENGTH
  RECORD_BYTES        = 198
  FILE_RECORDS        = 2
  ^SEQ_PARAM_TABLE   = "SES_FS3_CSN_1411140016_SEQP.TAB"
OBJECT                = SEQ_PARAM_TABLE
  NAME                = "SEQ_PARAM"
  INTERCHANGE_FORMAT = ASCII
  ROWS                = 2
  COLUMNS            = 22
  ROW_BYTES           = 198
  ^STRUCTURE         = "CAS_SEQ_PARAM_BURST3_FM3.FMT"
END_OBJECT            = SEQ_PARAM_TABLE
END_OBJECT            = FILE
```

```
OBJECT                = FILE
  RECORD_TYPE         = FIXED_LENGTH
  RECORD_BYTES        = 267
  FILE_RECORDS        = 42144
  ^DATA_TABLE         = "SES_FS3_CSN_1411140016_DATA.TAB"
OBJECT                = DATA_TABLE
  NAME                = "DATA"
  INTERCHANGE_FORMAT = ASCII
  ROWS                = 42144
  COLUMNS            = 26
  ROW_BYTES           = 267
  ^STRUCTURE         = "CAS_DATA3.FMT"
END_OBJECT            = DATA_TABLE
END_OBJECT            = FILE
```

```
OBJECT                = FILE
  RECORD_TYPE         = FIXED_LENGTH
  RECORD_BYTES        = 219
  FILE_RECORDS        = 2
  ^STAT_TABLE         = "SES_FS3_CSN_1411140016_STAT.TAB"
OBJECT                = STAT_TABLE
  NAME                = "STAT"
  INTERCHANGE_FORMAT = ASCII
  ROWS                = 2
  COLUMNS            = 38
  ROW_BYTES           = 219
  ^STRUCTURE         = "CAS_STAT2_FM3.FMT"
END_OBJECT            = STAT_TABLE
```

END\_OBJECT = FILE

END

## 5.6 Example of PDS label for PP level 3 data product

```

PDS_VERSION_ID          = PDS3
LABEL_REVISION_NOTE    = "2017-02-13, SONC, version 1.0"

/* Edited SC data from PP Active Test Mode (SONC Level 3) */

DATA_SET_ID             = "RL-C-SESAME-3-FSS-V1.0"
DATA_SET_NAME           = "ROSETTA-LANDER 67P SESAME 3 FSS V1.0"
PRODUCT_ID              = "SES_FS3_PAT_1411130810"
PRODUCT_CREATION_TIME   = 2017-02-13T17:42:48
MISSION_NAME            = "INTERNATIONAL ROSETTA MISSION"
MISSION_PHASE_NAME      = "FIRST SCIENCE SEQUENCE"
MISSION_ID              = ROSETTA
INSTRUMENT_HOST_NAME    = "ROSETTA-LANDER"
INSTRUMENT_HOST_ID      = RL

PRODUCT_TYPE            = RDR
START_TIME              = 2014-11-13T08:10:49.054
STOP_TIME               = 2014-11-13T08:13:07.335
SPACECRAFT_CLOCK_START_COUNT = "3/374486977.26"
SPACECRAFT_CLOCK_STOP_COUNT  = "3/374487116.03"

PRODUCER_ID             = "SONC"
PRODUCER_FULL_NAME      = "SCIENCE OPERATIONS AND NAVIGATION CENTER"
PRODUCER_INSTITUTION_NAME = "CNES"

INSTRUMENT_ID           = SESAME
INSTRUMENT_NAME         = "SURFACE ELECTRIC SOUNDING AND
                          ACOUSTIC MONITORING EXPERIMENT"
INSTRUMENT_TYPE         = {"ACOUSTIC SENSOR", "DUST IMPACT DETECTOR",
                          "PERMITTIVITY PROBE"}
TARGET_NAME             = "67P/CHURYUMOV-GERASIMENKO 1 (1969 R1)"
TARGET_TYPE             = "COMET"

PROCESSING_LEVEL_ID     = "3"
DATA_QUALITY_ID         = "-1"
DATA_QUALITY_DESC       = "-1 : NOT QUALIFIED"

/* DATA OBJECT DEFINITION */

OBJECT                   = FILE
  RECORD_TYPE            = FIXED_LENGTH
  RECORD_BYTES           = 102
  FILE_RECORDS           = 11
  ^AMT_PAR_TABLE         = "SES_FS3_PAT_1411130810_PARC.TAB"
  OBJECT                 = AMT_PAR_TABLE
  
```



```
NAME = "AMT_PAR"
INTERCHANGE_FORMAT = ASCII
ROWS = 11
COLUMNS = 12
ROW_BYTES = 102
^STRUCTURE = "PP_AMT2_PARC.FMT"
END_OBJECT = AMT_PAR_TABLE
END_OBJECT = FILE

OBJECT = FILE
RECORD_TYPE = FIXED_LENGTH
RECORD_BYTES = 64
FILE_RECORDS = 2161
^AMT_DAC_TABLE = "SES_FS3_PAT_1411130810_DACC.TAB"
OBJECT = AMT_DAC_TABLE
NAME = "AMT_DAC"
INTERCHANGE_FORMAT = ASCII
ROWS = 2161
COLUMNS = 5
ROW_BYTES = 64
^STRUCTURE = "PP_AMT_DACC.FMT"
END_OBJECT = AMT_DAC_TABLE
END_OBJECT = FILE

OBJECT = FILE
RECORD_TYPE = FIXED_LENGTH
RECORD_BYTES = 67
FILE_RECORDS = 9792
^AMT_TX_TABLE = "SES_FS3_PAT_1411130810_TXC.TAB"
OBJECT = AMT_TX_TABLE
NAME = "AMT_TX"
INTERCHANGE_FORMAT = ASCII
ROWS = 9792
COLUMNS = 5
ROW_BYTES = 67
^STRUCTURE = "PP_AMT_TXC.FMT"
END_OBJECT = AMT_TX_TABLE
END_OBJECT = FILE

OBJECT = FILE
RECORD_TYPE = FIXED_LENGTH
RECORD_BYTES = 66
FILE_RECORDS = 9792
^AMT_RX_TABLE = "SES_FS3_PAT_1411130810_RXC.TAB"
OBJECT = AMT_RX_TABLE
NAME = "AMT_RX"
INTERCHANGE_FORMAT = ASCII
ROWS = 9792
COLUMNS = 5
ROW_BYTES = 66
^STRUCTURE = "PP_AMT_RXC.FMT"
END_OBJECT = AMT_RX_TABLE
END_OBJECT = FILE
```

END