European Space Agency Research and Science Support Department Planetary Missions Division

Rosetta - ROMAP

To Planetary Science Archive Interface Control Document

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RO-ROL-ROMAP-EAICD

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Distribution List

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Change Log

Date	Sections Changed	Reasons for Change
23 December 2010	Creation of Issue 1 Revision 0	Delivery of Issue 1.0 to PSA after peer review
01/07/2015	Updated: -2.4.5 In-Flight data products -2.4.8 Ancillary Data Usage -3.2.3 Reference systems -3.2 SPM Quality parameter -4.2 Datasets, Definition and Content	Delivery of Issue 1.1 updated for the Comet phase
	Added: -3.2.2.2.5 Spacecraft Clock Count in PDS Labels	
	Deleted: -3.4.3.4.2 Geometric Index File -References to SPM derived data	
08/01/2016	Updated: 2.4.5. Inflight data products 3.1.4. Filenaming Conventions 3.2.3. Reference Frames	Comet related reference frames are added
14/07/2016	Updated:	RIDS
	The orientation of the SPM sensor channels has been added in Chapter 2.2.1.	
	Instrument Status description added in Chapter 2.2.2.	
	It has been pointed out in chapters 3.1.1., 3.3.1., 3.4.2., and 4.3.7. that the data cleaning process is irreversible and therefore those data are classified as "derived"	



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1 Introduction

1.1 Purpose and Scope

The purpose of this EAICD (Experimenter to Planetary Science Archive Interface Control Document) is two fold. First it provides users of the ROMAP instrument with detailed description of the product and a description of how it was generated, including data sources and destinations. Secondly, it is the official interface document between ROMAP and Planetary Science Archive (PSA) of ESA.

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 as:
 - 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 offers the creation of physical archive volumes on request.

1.3 Contents

This document describes the data flow of the ROMAP instrument on Rosetta from data acquisition 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 the data product is given. Examples of these are given in the appendix.

1.4 Intended Readership

The staff of the archiving authority (Planetary Science Archive, ESA, RSSD, Lander team, design team) and any potential user of the ROMAP data.



1.5 Applicable Documents

- AD 1. Planetary Data System Preparation Workbook, February 17, 1995, Version 3.1, JPL, D-7669, Part1
- AD 2. Planetary Data System Standards Reference, August 1, 2003, Version 3.6, JPL, D-7669, Part 2
- AD 3. Rosetta Archive Generation, Validation and Transfer Plan, January 10, 2006, Issue 2, Rev. 3, RO-EST-PL-5011
- AD 4. ROSETTA Archive Conventions RO-EST-TN-3372 Issue 7, Rev. 9, 06 April 2015
- AD 5. ROSETTA-RPC-MAG To Planetary Science Archive Interface Control Document EAICD RO-IGEP-TR0009 Issue 2.1
- AD 6. ROMAP Electronics FM2 ADP, RO-LRO-DP-300002-UA, Issue 1, Revision 0, 16/05/2001
- AD 7. ROMAP Boom & Sensor FM2 ADP, RO-LRO-DP-300003-UA, Issue 1, Revision 1, 16/07/.2001
- AD 8. ROMAP Instrument Calibration Report FM2, RO-LRO-TR-300010-WM, Issue 1, Rev. 1, 15/11/2000
- AD 9. CDMS Command and Data Management System Subsystem Specification RO-LCD-SP-3101 29/08/2001, Issue 3, Rev. 5
- AD 10. CDMS Command and Data Management System Operation Manual RO-LCD-SW-3402 12/02/2001, Issue 1, Rev. 2
- AD 11. Rosetta Time handling RO-EST-TN-3165, issue 1 rev 0, February 9, 2004
- AD 12. DDID- Data Delivery Interface Document RO-ESC-IF-5003 Issue B6 23/10/2003

1.6 Acronyms and Abbreviations

CDMS CEM CFF CNES CODMAC COSAC CSEQ DDS DECW EAICD EGSE ESA ESOC ESTEC ESS FM	Command and Data Management System Channel Electron Multiplier Comet Fixed Frame Centre National d'Etudes Spatiales Committee On Data Management, Archiving, and Computation Cometary Sampling And Composition Body-Centered Solar EQuatorial Frame Data Delivery System (ESOC server) Data Error Control Word Experiment Archive Interface Control Document Electronic Ground Support Equipment European Space Agency European Space Operation Center European Space Research and Technology Center Electrical Support System Flight Model
FPGA GRM	Field-Programmable Gate Array Ground Reference Model
HK	Housekeeping
IWF LOBT	Institut für Weltraumforschung (IWF) in Graz Lander On Board Time
MPS	Max-Planck-Institut für Sonnensystemforschung
N/A NASA	Not Applicable National Aeronautics and Space Administration
OBDH	On Board Data Handling
OOBT	Orbiter On Board Time
obt Pds Pecw Pi Pid Psa PVV	On Board Time Planetary Data System Packet Error Control Word Principal Investigator Process Identifier Planetary Science Archive PSA Volume Verifier



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QM RF ROMAP SC S/C SCET SFDU SONC TBC TBD TC	Qualification Model Radio Frequency Rosetta Magnetometer and Plasma Monitor Science Spacecraft Spacecraft Event Time Standard Formatted Data Unit Science Operations and Navigation Center(CNES-Toulouse) To Be Confirmed To Be Defined Telecomand
	Telecomand
UTC	Universal Time Coordinated

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2 Overview of Scientific Objectives, Instrument Design, Data Handling Process and Product Generation

Main scientific goals of ROMAP are (1) long term measurements on the surface to study the cometary activity as function of the distance from the Sun and (2) magnetic measurements during the descent phase of the Lander to investigate the structure of the remnant magnetization of the nucleus.

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The ROMAP sensors (fluxgate magnetometer, electrostatic analyser and Faraday cup) measure the magnetic field from 0 to 32Hz, ions up to 8.0 keV and electrons up to 4.2 keV. High integration level of sensors and electronics. That is the basic for a combined field/plasma measurement instrument with less than 1 Watt power consumption and 1 kg mass. Additional two pressure sensors are included in the ROMAP sensor arrangement. The sensors are moved from COSAC to ROMAP to optimise long term operation of pressure sensors. Data of both pressure sensors are transmitted within the housekeeping frame and are handled / archived as housekeeping values

2.1 Scientific Objectives

The Magnetometer (MAG) and the Simple Plasma Monitor (SPM) are the two experiments of the Small Instrument Package ROMAP, which complement the plasma packages onboard the ROSETTA Orbiter. Both instruments deliver data about the comet / solar wind interaction and the cometary activity as function of the distance from the sun and the onset of the diamagnetic cavity formation. The SPM sensor is able to determine the major solar wind parameters like density, speed, temperature, and flow direction. The Magnetometer sensor is able to determine the magnetic field vector.

Based on camera data from the flybys of the VEGA/GIOTTO spacecrafts at comet p/Halley in 1986, it was found that only a small part of the nucleus is active. As a consequence, new models about the internal structure of the nucleus were developed, in which the heat conductivity of the surface material is a key parameter. Up to the present, however, there are no direct measurements. On the background of such models, the gas production rate Q of the target comet p/Wirtanen was calculated as function of its radial distance to the Sun [Fuselier 1995; Kührt 1995]. Whereas the predictions of both models for perihelion distances are almost identical, they significantly differ for greater distances. For R=3.5AU, for example, there is a discrepancy of about four orders of magnitude: $Q=10^{23}$ s⁻¹ according to Fuselier's model and $Q=10^{27}$ s⁻¹ from Kührt. This great discrepancy is an example, which demonstrates the large uncertainties about the internal structure of the nucleus.

To date, most of the studies of comet-solar wind interaction address a well-developed cometary atmosphere. During the last decade, however, it has become apparent from both observation and theory that even weakly outgassing (or weakly magnetized) bodies may act as obstacles to the solar wind, creating effects that spacecraft magnetometers can resolve. As a result of bi-ion fluid simulations of the solar wind interaction with a weakly outgassing comet (Bogdanov et al. 1995), for example, one can distinguish between three main interaction regimes ordered with increasing neutral gas production rate Q. For Q<10²⁵ s⁻¹ the cometary activity is negligible and the body behaves like an asteroid. In the range 10^{25} s⁻¹ < Q < 10^{27} s⁻¹ effects become important that cannot be explained in the framework of classical one-fluid MHD theory since the characteristic scale lengths are smaller than the heavy ion gyro-radius. There is no bow shock, only Mach cone-like structures, and the heavy ion fluid flows along a cycloidal orbit accompanied by a small-scale structuring (heavy ion bunching). This structuring is sensitive to the parameters involved (Alfven Mach number, plasma beta, production rate). In the range 10^{27} s⁻¹ <Q one is confronted with a well-developed cometary atmosphere as, for example, found at p/Grigg-Skjellerup, p/Giacobini-Zinner and p/Halley. Characteristic features are the formation of a diamagnetic cavity in the immediate vicinity of the nucleus, a cometopause (ion composition boundary) and a bow shock.

For the formation of a magnetic cavity around the nucleus, from which the solar wind is excluded, a rough estimate can be derived. According to the momentum flux balance of solar wind and purely cometary plasma at the interface, the cavity radius is given by

 $R_{cavity} = \frac{\mu \sigma Q}{4\pi n_{sw} v_{sw}^2}$ (σ ionisation rate, μ mass ratio cometary ions to protons, n_{sw} solar wind density, v_{sw} solar

wind velocity; see also Haerendel 1987). A cavity with a radius of 10km (as a reasonable lower limit) requires a production rate Q=5×10²⁷ s⁻¹, which appears to be a threshold value for the existence of a cavity. After landing, magnetometer and plasma monitor shall operate in a common mode (surface mode). Aim is to measure during a full cometary rotation period (8h). If the operation time is limited for energy reasons operation during a full cometary day (4h) is planed. The measurement shall be repeated in regular intervals (e.g. each 4 days) to monitor the plasma evolution with closer distance to Sun. Measurements have to be done synchronously with RPC onboard the orbiter.



For the first time ever, the ROSETTA mission provides magnetic field measurements at very low distances from a cometary nucleus in a situation where the cometary activity is not yet fully developed. If the nucleus is not protected by an atmosphere produced by outgassing, the solar wind interacts directly with the intrinsic field and one can expect a situation similar to that observed at GALILEO's flyby at the asteroids Gaspra and Ida. Whereas the closest approach at these flybys was of the order of 1000 km, the situation here is much better because the surface field can be measured directly, practically not affected by the solar wind. In addition, during the approach to the nucleus, the probe can measure the variation of the magnetic field with distance and thus one should be able to clearly identify the type of the possible remnant magnetization.

Magnetometer data from GALILEO's flyby at the two asteroids Gaspra and Ida [Kivelson et al. 1993] together with model calculations [Baumgärtel et al. 1994, Kivelson et al. 1995a,b] have been interpreted in terms of an intrinsic magnetization of these bodies. It is generally assumed that this is remnant magnetization due to magnetic minerals such as iron-nickel, magnetite, and pyrrhotite, which were magnetized by relatively strong magnetic fields in the early solar nebula [e.g., Sugiura and Strangway 1988]. In the case of a generic relationship between asteroids and comets as to their refractory components, the magnetism of cometary nuclei could be caused by material exhibiting a natural remnant magnetization (NRM) in much the same way. Whether or not such material is present in cometary nuclei is still under debate.

Both, experimental results (mass spectrometry of particles escaped from p/Halley) and theoretical models point out primary magnetic minerals and possibly secondary magnetic material as well. One should expect the more pristine bright cometary regions to be characterized by rather primary magnetic material whereas the dark fractionated regions should be enriched by secondary magnetic material. More specifically, the following magnetic minerals/materials are being considered: Fe₃ O₄ (magnetite), Fe-Ni (metal) and (Fe,Ni)_{0.9} S (pyrrhotite) as major carriers in the light regions and magnetite and a Fe-S-Ni-Si-O-rich phase in the dark regions. This is probably the main carrier of the NRM in bulk samples of C1-chondrites.

The growth of fractal aggregates from collisions between small dust grains is generally accepted to be the first step in the formation of planetesimals and cometesimals in the early solar system. Until now, the graingrain interactions considered within this scenario were of mechanical and electrostatic nature only. If magnetized material were present at this stage, as is suggested by meteoritic and asteroidal evidence, magnetic interactions between dust particles should be taken into account as well. It has been shown experimentally [Nuth et al. 1994] and numerically [Nübold and Glassmeier 1999, 2000] that magnetized grains tend to build elongated structures of low fractal dimension and non-vanishing magnetic moment (see Figure 1). In case of enough magnetic material is available, this process may lead to centimetre or even metre sized magnetic structures, which ROMAP might be able to detect. Remnant magnetization of primitive objects such as comets could thus be called "accretional remanence".





Figure 1 . Accretional remanence of growing magnetic dust aggregates in a numerical simulation [Nübold and Glassmeier, 2000].

2.2 Instrument Design

The ROMAP hardware consists of a combined magnetic field (MAG) and plasma (SPM) sensor mounted on a small boom, the near sensor electronics, a high-voltage generator (HV-part) and a small DPU (controller).

2.2.1 ROMAP Sensors

The magnetic field is measured with a vector compensated ringcore fluxgate magnetometer designed by the TU-Braunschweig and manufactured by the MPE Garching. The sensor consists of two ringcores (crossed in to each other) as well as pick-up coils and Helmholtz coils for each sensor axis. The coil system design without mechanical support allows the compensation of the external field on the ringcore position with high homogeneity and low weight (the overall sensor weight is 30g). Dynamic feedback fields as well as offset fields up to 2000nT can be generated in order to compensate Lander and/or Orbiter DC stray fields. The determination of Lander and Orbiter offsets could be done during the cruise phase using non compressible waves in the solar wind [Hedgecock 1975]. Parallel measurements of Lander and Orbiter magnetometer during Lander eject, descent and during measurement campaigns on the cometary surface gives an additional input for the inflight calibration.

The main part of the SPM-sensor is a hemispherical electrostatic analyzer with two channeltrons (CEM's) for ions measurement and one for electrons measurement. The entry of the ion channels is equipped with deflection plates to realize the spatial resolution. Despite the small size of the sensor, the sensitivity and resolution of the instrument are high and its field of view wide (appr. 100 degree). The E/q-range extends from 0 to 8 kV. Using CEMs in counting mode the electrostatic analyzer measures electron and ion distribution in a wide energy range. Hemispherical deflection plates analyze the energy in 32 or 64 steps. All major plasma parameters as bulk velocity, density and isotropic temperature of electrons and protons can be derived. A retarding-grid Faraday cup sensor is implemented to measure currents due to fluxes of low energy charged particles on a collector plate. The Faraday cup measures the "reduced" velocity distribution of the plasma due



to its inherent integration over velocities contained in a plane of differential thickness perpendicular to the axis of the sensor. Because the sensor is not differential in angle, the Faraday cup requires relatively low data rates. But for a given orientation it provides differential information in velocity space only along a direction perpendicular to the retarding grid [Lazarus et al. 1993].



Figure 2 ROMAP MAG and SPM sensors compartment.

SPM sensor and fluxgate sensor integrated within one spherical sensor head. Figure 2 shows the sensor compartment. The sensor head is mounted on a 60 cm boom which is fixed with a hinge on the upper edge of the Lander structure and with a launch lock on the Lander balcony. After opening the launch lock, the boom



Figure 3 Pressure sensors

is deployed by two springs inside the hinge.

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Two pressure sensors are selected to cover the whole pressure range from 10⁻⁸mbar to 10¹mbar. For the range from 10⁻⁸mbar to 10⁻³mbar an ionising system (Penning) is deployed while for the range from 10⁻³mbar to 10¹mbar a heat conduction sensor (Minipirani) is available. The pressure data are transmitted in the housekeeping frames. They are handled and archived as housekeeping and not as scientific values. The combined magnetometer / SPM sensor is mounted on a 60 cm boom which is fixed with a hinge on the upper edge of the Lander structure and with a launch lock on the Lander balcony. After opening the launch lock, the boom is deployed by two springs inside the hinge. The SPM sensor, the Pressure sensors and all boom parts are designed by the MPS Lindau. The magnetometer sensor is provided by TU-BS.

The Boom and the related coordinate systems are shown in Figure 4a. In stowed position the opening angle is 19.6°. This angle opens to 90° with the deployment. The magnetometer coordinate system is identical with the ROMAP coordinate system. The alignment of the SPM Ion channels is shown in Figure 4b.

ROMAP sensor orientation

Coordinates (in Lander system) of rotation centre:

X:	186.82mm
Y:	-315.0mm
Z:	526.2mm

Sensor centre in stowed position:

X:	20.2mm
Y:	-315.0mm
Z:	58.7mm

Sensor centre in fully deployed position:

X:	-329.1mm
Y:	-315.0mm
Z:	526.2mm

Convertion of ROMAP system (R) in Lander System (L):

Stowed:

	(0	0.336	-0.942	
(L) =	1	0	0	(R)
	0	0.942	0.336	

Deployed:

		1		
(L)=	1	0	0	(R)
	0	0	1)	



Figure 4a ROMAP MAG sensor orientation



Figure 5b ROMAP SPM sensor orientation

2.2.2 ROMAP Electronics

The ROMAP electronics consists of two boards placed inside the common electronics box. The central part of the near sensor electronics on the first board is a FPGA which controls AD and DA-converters. The 16-bit AD converters are digitising science and housekeeping data from all three sensors. In the block diagram (Figure 6) this data flow is drawn with dotted lines.



Figure 6 ROMAP electronics



Typical analogue parts of fluxgate magnetometers like filters or phase-sensitive integrators are substituted by fast digitalization of the sensor AC-signal and the following data processing in FPGA's (which overtakes the functions of the former analogue parts) [Auster et al. 1995]. In this way mass is saved without any loss of accuracy. The resolution is still restricted by sensor noise (less than 5pT/ √Hz at 1Hz) [Fornacon et al. 1999], not by electronics. Compensation fields for the magnetometer and high voltage steps for electrostatic analyser and Faraday cup are controlled via DA-converters (dashed lines). The near sensor electronics is developed by Magson GmbH Berlin The high voltage generator (developed by the KFKI) is in a separate shielded box on the front panel of the common electronics box..

The controller is located on the second ROMAP board. It controls MAG and SPM, stores their data output and implements the interface to the Lander Command and Data Management System (CDMS). It triggers the measurement cycle of the magnetometer, implements the digital magnetometer algorithm, controls the magnetometer feedback and generates data frames. For the SPM sensors the controller has implemented the counting logic for electrons and ions, samples Faraday cup data, generates SPM data frames, controls the high voltage parameters (energy, elevation), controls the channeltron HV-supply and computes the plasma parameters. In the parameter mode only the sums of the rows and columns of the sampled ion and ion-current arrays are transmitted. The controller is based on a RTX2010. Address decoder, reset logic, clock generators, control signals generator, watchdog logic and CDMS interface are integrated within a FPGA. Hard- and software are developed by the IWF Graz.

The instrument parameters and the required recourses are given in the following tables:

type of sensor	parameter		value
Fluxgate	dynamic range		±2.000nT
Magnetometer	resolution		10pT
	sensor noise		<5pT/√Hz
	frequency range		032Hz
	offset drift		<0.1nT/°C
Electrostatic,	channels	ions	2 CEM
Hemispherical		electrons	1 CEM
Analyzer	energy range	ions	40 8000eV
		electrons	0,35 4200eV
	field of view	ions	100° x 100°
		electrons	10° x 60°
	energy steps		32 or 64, log. scaled
	max. count rate		10 ⁶ counts/s
	exposition time		40 1.000ms
Faraday cup	ion integral energy	distribution	up to 2000 eV
	resolution (current	mode)	±1.5 10 ⁻¹² - ±5.10 ⁻¹⁰ A
	field of view		140 [°] x 140 [°]
	energy steps		16 steps
	entrance area		6 cm ²
Penning Sensor	range		10 ⁻⁸ – 10 ⁻³ mbar
	electric Field		10 ⁶ V/m
	magnetic field		700 Gauss
Pirani Sensor	range		10 ⁻³ – 10 mbar
	bridge resistors		1kOhm

Instrument parameters:



ROMAP Resources

recourses	experiment part	requirements	$\boldsymbol{\Sigma}$
mass	MAG sensor	40g	
	SPM sensor	120g	
	Pressure sensor	110g	
	boom + hinge + cable	80g	
	launch lock	40g	
	pressure harness	50g	
	electronics in CEB	360g	
	(interface, analogue,		
	controller, HV-box, connectors,		
	frontplate)		
	Pressure E-Box	130g	930g
power	sensor electronics	350550mW	
	controller	180mW	
	penning electronics	100mW	
	pirani electronics	50mW	
	HV-part	200mW	<900mW
telemetry rate	surface mode		
	MAG	70 bits/s	
	SPM	30 bits/s	80 bits/s
	slow mode		
	MAG	70 bits/s	68 bits/s
	fast mode		
	MAG	4400 bits/s	4369 bits/s

ROMAP Instrument Status:

bit '	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
descr.	IM1	IM0	R:P	PR	PE	RR	RE	CAL	Ρ	F	R	12	11	CEM2	CEM1	CEM0
CEM20: I1 I2 R F CAL RE RR PE PR R:P IM1, IM0		ion c ion c raw all rc para SPM Raw Para Raw Para Raw Instr 00: F 01: \$	000: s 001: s 010: s 011: s 100: s channe data fr bws/co meter 1 calibr Data o Data o Data o meter	tep 1 tep 2 tep 3 tep 4 tep 5 l 1 ar l 2 ar ames data resolu Data Data E Para Mode AG M	nd ion ad ion are g are g are frame (auto sition tion reso amete e ider lode Aode	curre curre gener trans es are matio time settin settin lution er Dat	ent cl ent cl rated mitte gen c incr settin g: Lo n time setti setti a Cy	SUPPL SUPPL on(1)/of d in a ra erated o ease of ig: Short w(0)/Hig setting: ng: Low(cles: 1:1	on(1 on(1 f(0) w dat n(1)/a (0)/Lo h(1) Shoi 0)/Hi)/off(a fra off(0) active ong(1 rt(0)/l gh(1)	0) me o e(1)/ir 1) Long	nactiv		•		



2.3 Data Handling Process

SONC is responsible for data preparation and TU-BS is responsible for the distribution to Col's. The relevant contact information is provided in section 1.7.

The SONC is responsible for PDS ROMAP data sets generation and delivery to the PSA.

The ROMAP telemetry data are provided by the ESA DDS (Data Distribution Server). Following the operations plan the SONC pulls out archived packets (Science and HK) by direct request to the DDS via FTP and stores them into SONC database.

SONC also handles Auxiliary data (Attitude and Orbit files) pushed by the ESA DDS (data distribution system) server.

As soon as they are received, the Science and HK data raw packets are passed through data processing software. The SONC data processing system takes as input raw telemetry data (packets) and raw attitude and orbit files. The SPM raw data are decommutated into ions energy and angle distributions (currents and counts), Faraday cup current and electron energy distribution (counts) and preliminary calibrated. The magnetic field vectors in instrument frame are extracted, time stamped in UTC, converted to physical units (nT) and stored in the SONC database. These data are furthermore draft calibrated (offset, sensitivity and alignment calculation) and rotated into different coordinate systems (EMEJ2000, ECLIPJ2000, SM, GSM, GSE, MSO). The calibration can be performed with different sets of calibration data (alignment and sensitivity matrices and offset vectors) that are stored in the SONC database. This allows the use of different calibrations for different time intervals. The calibrated data are not stored in the SONC database but produced on the fly from the raw data and a selected calibration set.

Consequently, the following data are immediately available through W3-SONC server (<u>http://soncv2-rosetta.cnes.fr</u>) and the authorized¹ users can get them for a selected time interval :

- Science (SC) and Housekeeping (HK) raw packets as binary files
- Preliminary calibrated magnetometer data (SONC level 1) in selectable coordinate systems as ASCII files
- Preliminary calibrated plasma monitor data (SONC level 1)

Calibrated HK data as ASCII files

Moreover, the W3-SONC provides interactive plots of ROMAP science and housekeeping data.

After the proprietary period, the SONC team provides the raw data, preliminary calibrated data to the PSA team.

ROMAP-MAG Final calibration (SONC level 1_lab) has to be done by TU-BS using RPC data. Only some selected data intervals are provided to SONC and PDS during cruise.

The delivery format is described in this document.

2.4 Overview of Data Products

2.4.1 Pre-Flight Data Products

Preflight data are not subject of archiving. MAG as well as SPM data measured on ground are not representative due to environmental conditions (Earth field, stray fields, non vacuum): All relevant calibration results are summarized in the ADP.

¹ The authorization is controlled by PI (TU-BS). At his request, SONC delivers a login/password to the authorized user.



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2.4.2 Sub-System Tests

No sub-system test data are provided.

2.4.3 Instrument Calibrations

MAG : Only selected calibration data (interpretable with limited setup information) are archived. SPM : Instrument calibration data are not archived.

The file ROMAP_CALIBRATION_DESC.TXT (located in the DOCUMENT directory) contains information about MAG and SPM calibration.

2.4.4 Other Files written during Calibration

No additional files are available.

2.4.5 In-Flight Data Products

The in-flight data correspond to all the on board data. They can be produced during following mission phases :

Table 2-1 Mission phases

MISSION_PHASE_NAME	Abbreviation	Start Date	End Date	ROMAP d	lata (1)
		(dd/mm/yyyy)	(dd/mm/yyyy)	MAG	SPM
Commissioning (part 1)	CVP1	05/03/2004	06/06/2004	Х	
Cruise 1	CR1	07/06/2004	05/09/2004		
Commissioning (part 2)	CVP2	06/09/2004	16/10/2004	Х	
Earth Swing-by 1 (including PC#0)	EAR1	17/10/2004	04/04/2005	x	
Cruise 2 (including PC#1,2)	CR2	05/04/2005	28/07/2006	x	
Mars Swing-by (including PC#3,4,5)	MARS	29/07/2006	28/05/2007	Х	
Cruise 3	CR3	29/05/2007	12/09/2007		
Earth Swing-by 2 (including PC#6,7)	EAR2	13/09/2007	27/01/2008	x	
Cruise 4-1 (including PC#8)	CR4A	28/01/2008	03/08/2008	Х	
Steins Flyby	AST1	04/08/2008	05/10/2008	Х	
Cruise 4-2 (including PC#9)	CR4B	06/10/2008	13/09/2009	x	
Earth Swing-by 3 (including PC#10)	EAR3	14/09/2009	13/12/2009	Х	
Cruise 5 (including PC#12)	CR5	14/12/2009	06/06/2010	Х	
Lutetia Flyby	AST2	07/06/2010	10/09/2010	Х	
RV Manoeuver 1 (including PC#13)	RVM1	11/09/2010	13/07/2011	Х	
Cruise 6	CR6	14/07/2011	22/01/2014		



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Post Hibernation Commissionning	PHC	09/04/2014	24/04/2014	X	X
Pre-delivery calibration Science	PDCS	25/04/2014	11/11/2014	X	

(1) The last column indicates if ROMAP data are available

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 15:34:04	X	
Rebounds	RBD	2014/11/12 15:34:05	2014/11/12 17:30:20	X	Х
First Science Sequence	FSS	2014/11/12 17:30:21	2014/11/15 01:00:00	X	(X)
Long Term Science	LTS	tbd	tbd	tbc	

Note that ROMAP data just before the separation (from 2014/11/12 03:35:05) will be included into SDL phase.

SDL / RBD:

These datasets are not fully calibrated yet and should not be used for scientific analysis. Strong rotational signatures are still present due to lander movement. Level 5 data will become available, as soon as reliable attitude information exists.

FSS:

Level 5 data are available. Please note that only level 5 data should be used for scientific analysis.

SPM

Please note, that the observations during RBD are influenced by lander rotation. After the second touchdown at 17:25 UTC only very few particles were detected, which was caused by the sensor hitting the comet surface. No data after this event (and FSS) should be used for science.

The data, both scientific and housekeeping, are listed in document AD 6.



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Data products :

ROMAP-MAG

Edited (digital units) and draft calibrated data (in nT) are available for all mission phases. Calibrated data (in nT and cleaned from interferences) are available only for selected time intervals. The time intervals are selected when data from the Orbiter magnetometer (RPC-MAG) are available (see table Table 2-2 and §3.3.1). Only calibrated data are useful for scientific interpretation.

Edited (raw) data (in ADC units) provided by SONC Science : UTC, OBT, BX, BY, BZ

Draft Calibrated Data (in physical units, draft aligned and very draft offset corrected), provided by SONC

Science_A (in Mag Coordinates) : Science_B (in Lander Coordinates): Science_C (before release in S/C Coordinates): Science_C (after release in CFF Coordinates) Science_D (before release in ECLIPJ2000): Science D (after release in CSEQ Coordinates) UTC, OBT, POS_X, POS_Y, POS_Z, BX, BY, BZ UTC, OBT, POS_X, POS_Y, POS_Z, BX, BY, BZ

Final calibrated Data (in physical units, cleaned from offset and spacecraft disturbances), provided by IGeP (TU-BS)

Science E (in Mag Coordinates) :

Science_F (in Lander Coordinates):

Science_G (before release in S/C Coordinates):

Science_G (after release in CFF Coordinates)

Science_H (before release in ECLIPJ2000):

Science_H (after release in CSEQ Coordinates)

UTC, OBT, POS_X, POS_Y, POS_Z, BX, BY, BZ UTC, OBT, POS_X, POS_Y, POS_Z, BX, BY, BZ

Mission phase	Start time (UTC)	Stop time (UTC)	Remarks
Mars swing-by	2007-02-25T01:28:04	2007-02-25T02:28:01	
Steins fly-by	2008-09-05T18:08:17	2008-09-05T19:08:16	ROMAP-MAG is switched into fast mode (64 Hz). However these data are reduced to 1Hz because correction has been derived from RPC- ROMAP comparison.
Post Hibernation	2014-04-17T02:50:12	2014-04-17T05:39:11	
Commissioning	2014 07 14702:05:07	2014 07 14710-54-24	
Pre-delivery calibration	2014-07-14T03:05:07	2014-07-14T10:54:31	
Science	2014-09-08T00:50:05	2014-09-08T06:10:30	
	2014-09-15T13:15:06	2014-09-16T20:24:02	
	2014-09-25T05:50:06	2014-09-25T11:10:00	
	2014-10-06T20:45:06	2014-10-07T19:54:30	
	2014-10-16T21:15:06	2014-10-17T08:24:00	
Separation/Descent/Landing	2014-11-12T08:56:30	2014-11-12T15:34:06	After boom deployment
Rebounds	2014-11-12T15:34:10	2014-11-12T17:30:21	

Table 2-2 Final calibrated ROMAP-MAG data time intervals



The centre of the ecliptic J2000 frame is chosen according to the mission phase. During the cruise, the centre is the Sun, except for the flybys of the Earth, Mars and asteroids where the centre is the Earth, or Mars or asteroids.

Although, additional to the S/C system, local systems might be preferred if solar wind interaction or remnant magnetization should be analysed, transformations in those systems are not foreseen for asteroid flybys. It could be done by user. Note, that ROMAP data are used primarily for correction of RPC data. This has been done in S/C system.

The center for different time intervals is given in Table 2-3. Only centers different from Sun are given in the table.

Start time (UTC)	Stop time (UTC)	ECLIP J2000 center
2005/03/01 01:00:09	2005/03/07 23:29:42	Earth
2007/11/07 01:30:18	2007/11/13 22:38:18	Earth
2007/11/13 22:38:18	2007/11/20 13:19:01	Earth
2007/02/24 01:01:08	2007/02/25 13:53:32	Mars

Table 2-3 The center of the ECLIP J2000 reference system for different time intervals

ROMAP-SPM

Edited data (in instrument coordinates)

The ROMAP electronics generates 2 types of data frames - Raw Data Frames and Parameter Data frames. The SPM data products are separated accordingly, in RAW and SPM files. The sampling procedure is the same for both modes. Only the way of transmitting the data differs.

In the **RAW mode**, the sampled data of one measurement cycle for the ion and ion-current channels are held in arrays (energy elevation) in the ROMAP-Controller RAM.

After sampling for one measurement cycle is finished, data is packet into a specific amount of science data frames and transmitted via the CDMS interface.

For reducing the data amount, even and odd energies of both ion and ion-current channels can be transmitted alternating in consecutive Raw Data measurement cycles (at one measurement cycle the even energies of one ion channel and the odd energies of the other ion channel are transmitted and at the next measurement cycle vice versa). This is the default setting for SPM.

But also a full transmission of all energies can be selected. In this case for one cycle all data of one ion channel is transmitted and at the next cycle all of the other.

In the **PAR mode**, for reducing the amount of data to transmit, only the sums of the rows and columns of the sampled ion and ion-current arrays are transmitted. The sampling procedure is the same as for Raw Data transmission. The sums are computed when the sampling is finished.

Further details about ROMAP modes can be found in AD 6.

SC data products

For every science cycle:

UTC, OBT, Status of SPM (from HK parameters in SC data frame),

Raw Data

- 16 (for different angles) energy distributions (counts and current) for Ion1 and Ion2 sensors,
 - 1 energy distributions (current) for Faraday Cup sensors,
 - 1 energy distributions (counts) for Electron sensors

Parameter Data

- 1 energy distributions (counts and current) for lon1 and lon2 sensors,
- 1 angle distributions (counts and current) for lon1 and lon2 sensors,
- 1 energy distributions (current) for Faraday Cup sensors,



1 energy distributions (counts) for Electron sensors

Calibrated data : the same as for SC data, but in physical units: energy - in keV, angle - deg, count - in sm2, current - in nA - all in accordance with calibration data. Moreover for the calibrated data the orientation of sensors in ECLIPJ2000 coordinates is added for each distribution.

Derived data generated by SPM science group.

HK data products

Edited data (ADC counts)

16 housekeeping parameters: UTC, OBT, HK1, HK2, ..., HK16

Calibrated data (in physical units)

Same parameters as for edited data but in physical units: UTC, OBT, HK1, HK2, ..., HK16

2.4.6 Documentation

The documentation directory contains the following documents:

- ROMAP Electronics FM2 ADP, RO-LRO-DP-300002-UA, Issue 1, Revision 0, 16/05/2001
- EAICD (this document)
- ROMAP_CALIBRATION_DESC.TXT
- TIMELINE_ph.TXT, timeline Ascii file for phase ph
- TIMELINE_ph_DESC.TXT, description of the timeline file for phase ph
- TIMELINE_ph_obty.PNG, timeline Image file for phase ph and observation type obty

2.4.7 Derived and other Data Products

MAG : The final calibrated data are considered as CODMAC level 5 (derived product) since the correction procedure can not be described sufficiently and is not reproducible. It depends on detailed situation on board (temperatures, variable currents ...) and on availability of RPC data (for the detection of changing supply currents).

SPM : derived products are not generated

2.4.8 Ancillary Data Usage

The Lander Auxiliary Data on the comet (Position/Orientation/Illumination at any time + Comet models + Ancillary Data from the instruments) will be available in an ANCDR (Ancillary Data Record) whose definition is in progress, pending the Lander auxiliary data reconstruction.



3 Archive Format and Content

3.1 Format and Conventions

Data processing level number used in ROMAP naming scheme conforms to CODMAC norm :

2: Edited Data 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: Calibrated Data 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 resampling, so edited data can be reconstructed. NASA Level 1A.

5: Derived Data Derived results, as maps, reports, graphics, etc. NASA Levels 2 through 5.

3.1.1 Deliveries and Archive Volume Format

A data set is delivered for each **simple mission phase.** Each data set contains **only one level data processing**. The ROMAP MAG and SPM data are archived in a separate data sets.

The list of simple mission phases is given in

A data set is level-stamped as below :

- Level 2 when it contains :
- Uncalibrated SC or HK data (CODMAC level 2)
- Level 3 when it contains :
 - Preliminary calibrated SC or HK data (CODMAC level 3)

- Level 5 when it contains derived data (CODMAC level 5) which are in case of the magnetometer data which are finally calibrated and cleaned from spacecraft interferences. The cleaning proces is irreversible, therefor those data are classified as derived data.

In addition a data set contains :

• Documents (see chapter 3.4.3.9)

A new version of a data set is provided when :

- calibration information refining
- new data processing
- higher levels production.

3.1.2 Data Set ID Formation

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>



Note: The description field is used to distinguish ROMAP-MAG and ROMAP-SPM datasets.

See appendix F (16.1.1, 16.1.2) of Archive Plan Issue 2/2.

Examples of DATA_SET_ID and DATA_SET_NAME for ROMAP-MAG data obtained in-flight during CVP:

DATA_SET_NAME = "ROSETTA-LANDER CAL ROMAP 3 CVP MAG V1.0" DATA_SET_ID = "RL-CAL-ROMAP-3-CVP-MAG-V1.0"

3.1.3 Data Directory Naming Convention

See § 3.4.3.

3.1.4 Filenaming Convention

The following file **naming scheme** is used:

MAG file naming :

```
{exp}_{datatype}_{begin of observation}_{length of observation}.{ext}
```

- exp (3 character) = RHK (HK), MAG or SPM (SC)
- datatype (3 character) = XYZ
 - X = G for Ground, **F** for Flight
 - \circ Y = **S** for Science Data, **H** for Housekeeping Data,
 - Z = Data processing level :
 - 2 for edited data (HK, SC)
 - **3** for calibrated data (HK)

A for preliminary calibrated SC data, in physical units, draft aligned and very draft offset corrected, <u>in MAG coordinates</u>

B for preliminary calibrated SC data, in physical units, draft aligned and very draft offset corrected, <u>in Lander coordinates</u>

C for preliminary calibrated SC data, in physical units, draft aligned and very draft offset corrected, in S/C coordinates before Lander separation and in CFF frame after Lander separation

D for preliminary calibrated SC data, in physical units, draft aligned and very draft offset corrected, in ECLIPJ2000 coordinates before Lander separation and CSEQ system after Lander separation

E for final calibrated SC data, in physical units, cleaned from offset and spacecraft disturbances, <u>in MAG coordinates</u>

F for final calibrated SC data, in physical units, cleaned from offset and spacecraft disturbances, <u>in Lander coordinates</u>

G for final calibrated SC data, in physical units, cleaned from offset and spacecraft disturbances, , in S/C coordinates before Lander separation and in CFF frame after Lander separation

H for final calibrated SC data, in physical units, cleaned from offset and spacecraft disturbances, in ECLIPJ2000 coordinates before Lander separation and CSEQ system after Lander separation

o <u>SPM :</u>

2 for edited data (HK, SC), in MAG coordinates



3 for calibrated data (HK, SC), in Lander coordinates **5** for derived data (SC), in Lander coordinates

- begin of observation (12 characters) = time of test or working session in UTC yymmddhhmmss:
 - ∘ yy = year
 - mm = month
 - o dd = day
 - hh = hour
 - \circ mm = minute
 - \circ ss = second
- length of observation (5 characters) = duration of test or working session expressed in minutes. A file do not contain more than 10 day of data Two working sessions are separated by a gap greater than 100 seconds for MAG (SC), greater than 200 seconds for SPM (SC). A gap of 500 secondes is used for HK data.
- **ext** = extension of file. For ROMAP possible extensions are:
 - ROL for Raw Data containing HK and SC data mixed together (CODMAC level 1)
 - TAB for SC or HK Data (CODMAC level 2, 3 and 5)
 - LBL for label file associated to file .TAB

SPM file naming :

{exp}_{datatype}_{begin of observation}_{mode}.{ext}

- **exp** (3 or 4 characters)
 - o SPM for LBL files (combined detached labels, one LBL file points to several TAB files),
 - SPME for electron TAB files,
 - SPMF for Faraday cup TAB files,
 - SPMP for Parameter mode TAB files,
 - SPMR for Raw mode TAB files
- datatype (3 character) = XYZ
 - \circ X = **G** for Ground, **F** for Flight
 - Y = S for Science Data, H for Housekeeping Data,
 - Z = Data processing level :
 - 2 for edited data (HK, SC), in sensor coordinates
 - 3 for calibrated data (HK, SC), in Lander coordinates
 - 5 for derived data (SC), in Lander coordinates
- begin of observation (12 characters) = time of test or working session in UTC yymmddhhmmss:
 - ∘ yy = year
 - mm = month
 - \circ dd = day
 - \circ hh = hour
 - mm = minute
 - \circ ss = second
- mode = data type for SPM files
 - o for LBL files the possible values are:
 - RAW (Raw mode)
 - PAR (Parameter mode)



 \circ $\;$ For TAB files the possible values are :

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- CNA (counts-angle distribution)
 - CNE (counts-energy distribution)
 - CRA (current-angle distribution)
 - CRE (current-energy distribution)
 - CN (counts-energy-angle distribution)
 - CR (current-energy-angle distribution)
- **ext** = extension of file. For ROMAP possible extensions are:
 - ROL for Raw Data containing HK and SC data mixed together (CODMAC level 1)
 - TAB for SC or HK Data (CODMAC level 2, 3 and 5)
 - LBL for label file associated to file .TAB

Examples :

0

MAG_FSA_040603123400_01542.TAB

Data included in this file are ROMAP-MAG Science data recorded on flight on 03 June 2004 beginning at 12:34:00 (UTC) for a duration of 1542 minutes. They are preliminary calibrated, in MAG coordinates.

SPMP_FS2_141112173046_CNA.TAB Data included in this file are ROMAP-SPM edited science data in parameter mode recorded on comet on 14 Nov 2014 beginning at 17:30:46 (UTC). The file contains ions counts-angle distribution.

RHK_FH3_040903121000_00800.TAB

Data included in this file are calibrated HK flight data recorded on 09 Sep 2004 beginning at 12:10:00 (UTC) for a duration of 800 minutes.

3.2 Standards Used in Data Product Generation

3.2.1 PDS Standards

The archive structure given in this document complies with PDS standard version 3.6.

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 bytes². For transmission between Lander and Orbiter, a 4 bytes synchro 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.

To comply with ESA requirements, the time registered in the CDMS packets is the **OOBT**. It is reconstituted from the LOBT, as shown in Figure 7:



Figure 7 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.

² 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).



Figure 8 On board data flow

• Afterwards, SONC processes science raw packets in order to recompose the science measurement (e.g. an image, a spectrum, ...).

Figure 8 gives an overview of this data flow.

Only 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) (synchronised with OOBT) extracted from the packet, and corresponding UTC time coming from the SFDU header, are added.

- UTC time is calculated from the On-Board time taking into account the On-Board clock drift as following : UTC (seconds since 01/01/1970) = LOBT(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 : 03/04/2007 10 :42 :07).

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



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3.2.2.2 ROMAP Time standards

The time standards used in the ROMAP data products are :

- the ROMAP on-board time,
- the Lander on-board time,
- the DDS header time correlated,
- the UTC.

3.2.2.2.1 The ROMAP On-Board Time

ROMAP puts a time stamp of the first vector in a science data frame (MAG) or of the beginning of a data collection cycle (SPM) into the frame header. The timing information for subsequent data in the frame can be computed with the time stamp as reference. Because the interval of the received OBT is too low, the ROMAP-Controller integrates a 16bit counter with 1/32s resolution that is reset when a new OBT is received. For getting accurate time stamps, the value of the internal counter is read and added to the last received OBT. Then the time is stored to the data frame.

3.2.2.2.2 The 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 analysed 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 sec stored in 3 16-bit words.

The <u>Lander On-Board Time</u> (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 AD 9).

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 is kept synchronized as long as the Lander is powered.

Technical details about sychronisation of Lander On-board Time can be found in § 2.3.2.6 of AD 9.

For a description of time handling in the Rosetta project see AD 11.

For a description of Lander on board time handling see AD 9 :

§ 2.3.2.6 Synchronisation 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 AD 10 § 6. About Lander On-board Time.

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3.2.2.2.3 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 1st January 1970 and the second (LSB) integer the number of microseconds from seconds in the first field.

Time correlation is described in AD 12 § 18.1.2.1.

3.2.2.2.4 The UTC (Coordinated Universal Time)

The <u>UTC</u> used as time stamp for SC and HK ROMAP data products (from level 2 to level 3) is calculated from the experiment on-board time taking into account the drift and reset clock.

3.2.2.2.5 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 unit seconds and the fractional seconds are separated by the full stop character. **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 25-1 = 31. E.g. in SPACECRAFT_CLOCK_START_COUNT = "3/356281394.21" the 21 fractional seconds correspond to 21 × 2.5 = 0.65625 decimal seconds.

The reset number is an integer starting at 1, i.e. "1/" means LOBT = 0 at 2003-01-01T00:00:00 UTC.



3.2.3 Reference Systems

The reference systems used for ROMAP data products are either hardware related or systems related to solar system bodies.

Instrument coordinates (defined by the feedback system of the magnetometer sensor), Rosetta Lander coordinates and Rosetta Orbiter coordinates (S/C system) are used as hardware related reference systems.

After Lander separation the CFF system (Comet Fixed Frame), a body-centered coordinate systems is used instead of the S/C system. The positive Z-axis of the CFF system is pointing along the cometary rotation axis, and the X-axis is in the equatorial plane, parallel to the longest axis of the nucleus, in the direction of the small lobe of the nucleus. The Y-axis completes the right-handed system; the X-axis prime meridian is through the CHEOPS boulder.

For cruise phases the ECLIPJ2000 is used. (Ecliptic coordinates based upon the J2000 frame, i.e. the Earth mean equator and dynamical equinox of J2000). The X-axis is aligned with the cross product of the north-pointing vectors normal to the Earth's mean equator and mean orbital plane of J2000 epoch. The Z-axis is aligned with the second of these normal vectors. The Y axis is the cross product of the Z and X axes.

After Lander separation the CSEQ system (Body-centered Solar Equatorial) is used instead of the ECLIPJ2000 frame. This frame is defined as a two-vector style dynamic frame as follows: +X axis is the position of the Sun relative to the body; it's the primary vector and points from the body to the Sun; +Z axis is the component of the Sun's north pole of date orthogonal to the +X axis; +Y axis completes the right-handed reference frame; The origin of this frame is the body's center of mass.

3.3 Data Validation

The ROMAP data products are delivered to PSA by SONC. All the levels SC and HK data produced by SONC are validated by ROMAP PIs. These data are also distributed via the W3-SONC server and used by all the experiment team.

3.3.1 MAG quality parameter

Magnetometer quality parameter are given draft calibrated (CODMAC level 2) and final calibrated data (CODMAC level 3). Five levels are defined as follow.

- Level 0: absolute error less than 1nT
- Level 1: absolute error less than 5nT
- Level 2: absolute error less than 10nT
- Level 3: absolute error less than 100nT
- Level 4: absolute error exceed 100nT

Draft calibrated data are processed from edited data by linear transformation using a default calibration matrix and a preliminary offset (averaged value). As long the Lander is not released the data are disturbed by an offset drift due to changing balcony temperatures (temperature coefficient of compensation magnet) and the magnetic field caused by the supply current of the Lander (GND loop due to electrical contact between orbiter and lander structure). Especially the dependency on supply current can be in the order of several hundred nT (1mA corresponds to about 1nT) and leads sometimes to saturation of the magnetic field measurement. Therefore for most of the intervals in which the lander is active (AFT's) are draft calibrated data are level 4 data.



Final calibrated data are processed by draft calibrated data by applying a manually generated correction function. Drifts are related to TCU temperature measurements, signatures of changing supply currents are detected by comparison of RPC-MAG and Romap data. This part of the procedure can not be automated. It is done for selected intervals and only the calibrated data and not procedure and correction function are subject of archiving. Therefore the final calibrated data are classified as derived data (CODMAC level 5). Expected quality levels are 0-2.

3.3.2 SPM quality parameter

Three data quality levels are defined for SPM. We keep however four levels (with level 2 not used) in order to have the same scheme for quality definition as for MAG data, i.e. quality ID goes from level 0 – best quality to level 4 - worst quality.

- Level 0: data quality is perfect, that means counts doesn't depends on high voltage level
- Level 1: data are scientifically of interest, but calibration could be wrong due to too low high voltage level (degradation of channeltrons might be the reason)
- Level 2: data are scientifically of interest, but field of view is unknown due to Philae motion
- Level 3: data are scientifically wrong e.g. because sensor is directed to orbiter (all times during cruise) but technologically usable
- Level 4: data are scientifically and technologically wrong

3.4 Content

3.4.1 Volume Set

One volume corresponds to one data set. The possible values of VOLUME keywords can be found in AD 4. The volume keyword values for the Mars mission phase are given in the following example.

VOLUME_NAME	= "ROMAP MAG RAW DATA FOR THE MARS SWING-BY"					
VOLUME SERIES NAME	= "ROSETTA SCIENCE ARCHIVE"					
VOLUME SET ID	= "DE TUBS IGEP RLMAG 10XX"					
VOLUME SET NAME	= "ROSETTA ROMAP MAG DATA"					
VOLUME ID	= "RLMAG2 1023"					
VOLUME VERSION ID	= "VERSION 1"					
VOLUME FORMAT	= "ISO-9660"					
MEDIUM TYPE	= "ONLINE"					
VOLUMES	= 35					
PUBLICATION DATE	= 2009-06-29					
DESCRIPTION	= " This volume contains data					
	and supporting documentation					
	from the Rosetta Mars swing by					
mission phase "						

3.4.2 Data Set

The ROMAP data are archived in as many Data Sets as simple mission phase and level data processing. The MAG and SPM data are archived in a separate data sets

Name element	Data Set ID	Data Set Name
--------------	-------------	---------------



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INSTRUMENT_HOST_ID / INSTRUMENT_HOST_NAME	RL (Rosetta Lander)	ROSETTA-LANDER
Target id / target name	See AD 4	AD 4
INSTRUMENT_NAME	ROSETTA LANDER MAGNETOME	TER AND PLASMA MONITOR
INSTRUMENT_ID	ROMAP	
Data processing level number	* Level 2 contains non converted da * Level 3 contains preliminary calibra * Level 5 contains calibrated data from have been removed. Those are derived algorithm is done manually and too Remark: Level 2 and preliminary leven the end of the proprietary period. Lee Only level 5 data are usable for scie	ated data om which all interference signatures ved data because the cleaning sophisticate for being reproducible. rel 3 data are delivered directly after vel 5 data are delivered when ready
mission phase abbreviation	See	
description	N/A	N/A.
version	The first version of a data set is V1.0	5

The archive contains 5 types of data sets.

- two for Level 2 data (edited data) :

DATA_SET_ID = "RL>-<target name>-ROMAP-2>-<mission phase abbreviation>-<MAG>-Vx.x" DATA_SET_ID = "RL>-<target name>-ROMAP-2>-<mission phase abbreviation>-<SPM>-Vx.x"

- two for Level 3 data (preliminary and final calibrated data) :

DATA_SET_ID = "RL>-<target name>-ROMAP-3>-<mission phase abbreviation>-<MAG>-Vx.x" DATA_SET_ID = "RL>-<target name>-ROMAP-3>-<mission phase abbreviation>-<SPM>-Vx.x"

- one for Level 5 data (derived data) :

DATA_SET_ID = "RL>-<target name>-ROMAP-5>-<mission phase abbreviation>-<SPM>-Vx.x"

3.4.3 Directories

The organisation (directories) of each dataset type is shown below.

Level 2 datasets :

|-AAREADME.TXT |-CATALOG-| |-SC (Level 2 SC data files) |-DATA-----| | |-HK (Level 2 HK data files) |-DOCUMENT-|-INDEX-|-LABEL-|-VOLDESC.CAT

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-DATA		
-INDEX- -LABEL- -VOLDESC.CAT		
-AAREADME.TXT		
SC_FIN	IAL (MAG E,F,G,H)	
HK (Le	evel 3 HK data fil	les)
 -DOCUMENT- -INDEX- -LABEL- -VOLDESC.CAT		
	-AAREADME.TXT -CATALOG- -SC_PRE -DATA HK (Le -DOCUMENT- -INDEX- -LABEL- -VOLDESC.CAT -AAREADME.TXT -CATALOG- -SC_FIN -DATA HK (Le -DOCUMENT- -INDEX- -LABEL-	ROMAP EAICD Issue/Rev. No. Date Page

3.4.3.1 Root Directory

The root directory contains the following files

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

The name of the root directory is the data set ID.

3.4.3.2 Calibration Directory

Calibration information can be found in the file ROMAP_CALIBRATION_DESC.TXT located in the DOCUMENT directory.

3.4.3.3 Catalog Directory

The catalog directory provides a top level understanding of the mission, spacecraft, instruments and data sets. The catalog directory contains the following files:



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File Name	Contents
CATINFO.TXT	A description of the contents of the catalogue
	directory
DATASET.CAT	Data set information
INST.CAT	Instrument information
INSTHOST.CAT	Instrument host (spacecraft) information
MISSION.CAT	Mission information
PERSON.CAT	PDS personnel catalogue information about the
	instrument team responsible for generating the data
	products. There is one file for each instrument team
	providing data to this data set.
REF.CAT	Full citations for references mentioned in any and
	all of the catalogue files, or in any associated label
	files
SOFTWARE.CAT	Information about the software included in the
	SOFTWARE directory

3.4.3.4 Index Directory

The index directory contains the indices for all data products on the data set. The following files are included in the index directory:

File Name	Contents
INDEX.LBL	PDS label for the volume index file, INDEX.TAB
INDEX.TAB	Volume index in tabular format
INDXINFO.TXT	A description of the contents of the Index Directory

3.4.3.5 Geometry Directory

There is no geometry directory.

3.4.3.6 Software Directory

There is no software directory.

3.4.3.7 Gazetter Directory

There is no Gazetter directory.

3.4.3.8 Label Directory

The label directory contains include files (.FMT files with label definitions) referenced by data files on the data set. The following files are included in the index directory:

File Name	Contents
LABINFO.TXT	A description of the contents of this directory (.FMT files)
ROMAP_RAWHK.FMT	Edited (raw) HK data
ROMAP_CALHK.FMT	Calibrated HK data
ROMAP_MAG_RAWSC.FMT	Edited (raw) Science data


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ROMAP_MAG_CALSCA.FMT	Draft Calibrated Data, Instrument coordinates
ROMAP_MAG_CALSCB.FMT	Draft Calibrated Data, Lander coordinates
ROMAP_MAG_CALSCC.FMT	Draft Calibrated Data, Orbiter coordinates
ROMAP_MAG_CALSCD.FMT	Draft Calibrated Data, ECLIP J2000 coordinates
ROMAP_MAG_CALSCE.FMT	Final Calibrated Data, Instrument coordinates
ROMAP MAG CALSCF.FMT	Final Calibrated Data, Lander coordinates
ROMAP MAG CALSCG.FMT	Final Calibrated Data, Orbiter coordinates
ROMAP MAG CALSCH.FMT	Final Calibrated Data, ECLIP J2000 coordinates
ROMAP SPM RAW ION CN.FMT	raw mode
	Ion spectrum definition (counts-energy-angle
	distribution, channels 1 or 2) ; Level 2
ROMAP SPM RAW ION CR.FMT	raw mode
	Ion spectrum definition (current-energy- angle),
	(channels 1 or 2) ; Level 2
ROMAP_SPM_PAR_ION_CNE.FMT	parameter mode
	Ion spectrum definition (counts-energy distribution),
	(channels 1 or 2) ; Level 2
ROMAP_SPM_PAR_ION_CRE.FMT	parameter mode
	Ion spectrum definition (current-energy distribution),
	(channels 1 or 2) ; Level 2
ROMAP SPM PAR ION CNA.FMT	parameter mode
	Ion spectrum definition (counts-angle distribution),
ROMAP_SPM_PAR_ION_CRA.FMT	(channels 1 or 2) ; Level 2
ROMAP_SPM_PAR_ION_CRA.FMT	parameter mode
	lon spectrum definition (current-angle), (channels 1 or 2)
	; Level 2
ROMAP_SPM_FC.FMT	Faraday cup current-energy distribution ; Level 2
ROMAP_SPM_ELEC.FMT	Electron spectrum (count-energy distribution)
DOMAD COM DAVAG JON ON EMT	Level 2
ROMAP_SPM_RAWC_ION_CN.FMT	raw mode
	Ion spectrum definition (counts-energy-angle
DOMAD COM DAMAC JON OD EMT	distribution), (channels 1 or 2) ; Level 3
ROMAP_SPM_RAWC_ION_CR.FMT	raw mode
	Ion spectrum definition (current-energy-angle),
	(channels 1 or 2) ; Level 3
ROMAP_SPM_PARC_ICNT_CNE.FMT	parameter mode
	Ion spectrum definition (counts-energy distribution),
	(channels 1 or 2) ; Level 3
ROMAP_SPM_PARC_ION_CRE.FMT	parameter mode
	Ion spectrum definition (current-energy distribution),
	(channels 1 or 2); Level 3angles)
ROMAP_SPM_PARC_ION_CNA.FMT	parameter mode
	Ion spectrum definition (counts-angle distribution),
	(channels 1 or 2) ; Level 3
ROMAP_SPM_PARC_ION_CRA.FMT	parameter mode
	Ion spectrum definition (current-angle), (channels 1 or 2)
	; Level 3
ROMAP_SPM_FCC.FMT	Faraday cup current-energy distribution ; Level 3
ROMAP_SPM_ELECC.FMT	Electron spectrum (count-energy distribution)
	Level 3

3.4.3.9 Document Directory

This directory contains documentation to help the user to understand and use the archive data. The following



files are contained in the document directory:

File Name	Contents
DOCINFO.TXT	A description of the contents of this directory
RO-LRO-DP-300002-UA.PDF	ROMAP FM2 ADP
RO-LRO-DP-300002-UA.LBL	PDS label for file RO-LRO-DP-300002-UA
EAICD_ROMAP.PDF	This document
EAICD_ROMAP.LBL	PDS label for file EAICD_ROMAP.PDF
ROMAP_CALIBRATION_DESC.TXT	Description of the calibration of MAG and SPM
ROMAP_CALIBRATION_DESC.LBL	PDS label for ROMAP_CALIBRATION_DESC.TXT
RL_ROMAP_LOGBOOK.TXT	Listing ROMAP operations
RL_ROMAP_LOGBOOK.LBL	PDS label for RL_ROMAP_LOGBOOK.TXT
TIMELINE_SDL_RBD_FSS.TXT	Timeline Ascii file with the PDS label attached for mission
	phases SDL (Separation Descent and Landing), RBD
	(Rebounds) and FSS (First science Sequence)
TIMELINE_SDL_RBD_FSS_DESC.TXT	Description of the timeline file for mission phases SDL,
	RBD and FSS
TIMELINE_SDL_RBD_FSS_1.PNG	Timeline Image file of Philae activities performed during
	SDL, RBD and FSS mission phases
TIMELINE_SDL_RBD_FSS_2.PNG	Timeline of Philae instruments data availability SDL, RBD
	and FSS mission phases
TIMELINE_SDL_RBD_FSS.LBL	PDS label for files TIMELINE_SDL_RBD_FSS_1.PNG and
	TIMELINE_SDL_RBD_FSS_2.PNG

3.4.3.10 Data Directory

The structure and naming scheme of the data directory is described in chapter 3.4.3.

4 Detailed Interface Specifications

4.1 Structure and Organization Overview

The ROMAP MAG and SPM data are archived in a separate data sets on the basis mission phase relative to the production of the data. The ROMAP MAG DATA directory contains subdirectories with preliminary and final calibrated data.

4.2 Data Sets, Definition and Content

The following table gives the definition of the name and id of the ROMAP data sets :

Data Set ID	Data Set Name
RL-CAL-ROMAP-2-CVP-MAG-V1.0	ROSETTA-LANDER CAL ROMAP 2 CVP MAG V1.0
RL-CAL-ROMAP-2-CR2-MAG-V1.0	ROSETTA-LANDER CAL ROMAP 2 CR2 MAG V1.0
RL-CAL-ROMAP-2-CR4A-MAG-V1.0	ROSETTA-LANDER CAL ROMAP 2 CR4A MAG V1.0
RL-CAL-ROMAP-2-CR4B-MAG-V1.0	ROSETTA-LANDER CAL ROMAP 2 CR4B MAG V1.0
RL-CAL-ROMAP-2-CR5-MAG-V1.0	ROSETTA-LANDER CAL ROMAP 2 CR5 MAG V1.0
RL-CAL-ROMAP-2-RVM1-MAG-V1.0	ROSETTA-LANDER CAL ROMAP 2 RVM1 MAG V1.0
RL-CAL-ROMAP-2-RVM2-MAG-V1.0	ROSETTA-LANDER CAL ROMAP 2 RVM2 MAG V1.0
RL-CAL-ROMAP-3-CR2-MAG-V1.0	ROSETTA-LANDER CAL ROMAP 3 CR2 MAG V1.0
RL-CAL-ROMAP-3-CR4A-MAG-V1.0	ROSETTA-LANDER CAL ROMAP 3 CR4A MAG V1.0



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RL-CAL-ROMAP-3-CR4B-MAG-V1.0	ROSETTA-LANDER CAL ROMAP 3 CR4B MAG V1.0
RL-CAL-ROMAP-3-CR5-MAG-V1.0	ROSETTA-LANDER CAL ROMAP 3 CR5 MAG V1.0
RL-CAL-ROMAP-3-RVM1-MAG-V1.0	ROSETTA-LANDER CAL ROMAP 3 RVM1 MAG V1.0
RL-CAL-ROMAP-3-RVM2-MAG-V1.0	ROSETTA-LANDER CAL ROMAP 3 RVM2 MAG V1.0
RL-E-ROMAP-2-EAR1-MAG-V1.0	ROSETTA-LANDER EARTH ROMAP 2 EAR1 MAG V1.0
RL-E-ROMAP-2-EAR2-MAG-V1.0	ROSETTA-LANDER EARTH ROMAP 2 EAR2 MAG V1.0
RL-E-ROMAP-2-EAR3-MAG-V1.0	ROSETTA-LANDER EARTH ROMAP 2 EAR3 MAG V1.0
RL-E-ROMAP-3-EAR1-MAG-V1.0	ROSETTA-LANDER EARTH ROMAP 3 EAR1 MAG V1.0
RL-E-ROMAP-3-EAR2-MAG-V1.0	ROSETTA-LANDER EARTH ROMAP 3 EAR2 MAG V1.0
RL-E-ROMAP-3-EAR3-MAG-V1.0	ROSETTA-LANDER EARTH ROMAP 3 EAR3 MAG V1.0
RL-M-ROMAP-2-MARS-MAG-V1.0	ROSETTA-LANDER MARS ROMAP 2 MARS MAG V1.0
RL-M-ROMAP-3-MARS-MAG-V1.0	ROSETTA-LANDER MARS ROMAP 3 MARS MAG V1.0
RL-M-ROMAP-5-MARS-MAG-V1.0	ROSETTA-LANDER MARS ROMAP 5 MARS MAG V1.0
RL-A-ROMAP-2-AST1-MAG-V1.0	ROSETTA-LANDER STEINS ROMAP 2 AST1 MAG V1.0
RL-A-ROMAP-3-AST1-MAG-V1.0	ROSETTA-LANDER STEINS ROMAP 3 AST1 MAG V1.0
RL-A-ROMAP-5-AST1-MAG-V1.0	ROSETTA-LANDER STEINS ROMAP 5 AST1 MAG V1.0
RL-A-ROMAP-2-AST2-MAG-V1.0	ROSETTA-LANDER LUTETIA ROMAP 2 AST2 MAG V1.0
RL-A-ROMAP-3-AST2-MAG-V1.0	ROSETTA-LANDER LUTETIA ROMAP 3 AST2 MAG V1.0
RL-CAL-ROMAP-2-PHC-MAG-V1.0	ROSETTA-LANDER 67P ROMAP 2 PHC MAG V1.0
RL-CAL-ROMAP-2-PDCS-MAG-V1.0	ROSETTA-LANDER 67P ROMAP 2 PDCS MAG V1.0
RL-C-ROMAP-2-SDL-MAG-V1.0	ROSETTA-LANDER 67P ROMAP 2 SDL MAG V1.0
RL-C-ROMAP-2-RBD-MAG-V1.0	ROSETTA-LANDER 67P ROMAP 2 RBD MAG V1.0
RL-C-ROMAP-2-FSS-MAG-V1.0	ROSETTA-LANDER 67P ROMAP 2 FSS MAG V1.0
RL-CAL-ROMAP-3-PHC-MAG-V1.0	ROSETTA-LANDER 67P ROMAP 3 PHC MAG V1.0
RL-CAL-ROMAP-3-PDCS-MAG-V1.0	ROSETTA-LANDER 67P ROMAP 3 PDCS MAG V1.0
RL-C-ROMAP-3-SDL-MAG-V1.0	ROSETTA-LANDER 67P ROMAP 3 SDL MAG V1.0
RL-C-ROMAP-3-RBD-MAG-V1.0	ROSETTA-LANDER 67P ROMAP 3 RBD MAG V1.0
RL-C-ROMAP-3-FSS-MAG-V1.0	ROSETTA-LANDER 67P ROMAP 3 FSS MAG V1.0
RL-CAL-ROMAP-5-PHC-MAG-V1.0	ROSETTA-LANDER 67P ROMAP 5 PHC MAG V1.0
RL-CAL-ROMAP-5-PDCS-MAG-V1.0	ROSETTA-LANDER 67P ROMAP 5 PDCS MAG V1.0
RL-C-ROMAP-5-SDL-MAG-V1.0	ROSETTA-LANDER 67P ROMAP 5 SDL MAG V1.0
RL-C-ROMAP-5-RBD-MAG-V1.0	ROSETTA-LANDER 67P ROMAP 5 RBD MAG V1.0
RL-C-ROMAP-5-FSS-MAG-V1.0	ROSETTA-LANDER 67P ROMAP 5 FSS MAG V1.0
RL-CAL-ROMAP-2-CVP-SPM-V1.0	ROSETTA-LANDER CAL ROMAP 2 CVP SPM V1.0
RL-CAL-ROMAP-2-CR4A-SPM-V1.0	ROSETTA-LANDER CAL ROMAP 2 CR4A SPM V1.0
RL-CAL-ROMAP-2-RVM2-SPM-V1.0	ROSETTA-LANDER CAL ROMAP 3 RVM2 SPM V1.0
RL-CAL-ROMAP-3-CR4A-SPM-V1.0	ROSETTA-LANDER CAL ROMAP 3 CR4A SPM V1.0
RL-CAL-ROMAP-3-RVM2-SPM-V1.0	ROSETTA-LANDER CAL ROMAP 3 RVM2 SPM V1.0
RL-E-ROMAP-2-EAR3-SPM-V1.0	ROSETTA-LANDER EARTH ROMAP 2 EAR3 SPM V1.0
RL-E-ROMAP-3-EAR3-SPM-V1.0	ROSETTA-LANDER EARTH ROMAP 3 EAR3 SPM V1.0
RL-M-ROMAP-2-MARS-SPM-V1.0	ROSETTA-LANDER MARS ROMAP 2 MARS SPM V1.0
RL-M-ROMAP-3-MARS-SPM-V1.0	ROSETTA-LANDER MARS ROMAP 3 MARS SPM V1.0
RL-CAL-ROMAP-2-PHC-SPM-V1.0	ROSETTA-LANDER 67P ROMAP 2 PHC SPM V1.0
RL-CAL-ROMAP-2-PDCS-SPM-V1.0	ROSETTA-LANDER 67P ROMAP 2 PDCS SPM V1.0
RL-C-ROMAP-2-SDL-SPM-V1.0	ROSETTA-LANDER 67P ROMAP 2 SDL SPM V1.0
RL-C-ROMAP-2-RBD-SPM-V1.0	ROSETTA-LANDER 67P ROMAP 2 RBD SPM V1.0
RL-C-ROMAP-2-FSS-SPM-V1.0	ROSETTA-LANDER 67P ROMAP 2 FSS SPM V1.0
RL-CAL-ROMAP-3-PHC-SPM-V1.0	ROSETTA-LANDER 67P ROMAP 3 PHC SPM V1.0
RL-CAL-ROMAP-3-PDCS-SPM-V1.0	ROSETTA-LANDER 67P ROMAP 3 PDCS SPM V1.0
RL-C-ROMAP-3-SDL-SPM-V1.0	ROSETTA-LANDER 67P ROMAP 3 SDL SPM V1.0
RL-C-ROMAP-3-RBD-SPM-V1.0	ROSETTA-LANDER 67P ROMAP 3 RBD SPM V1.0
RL-C-ROMAP-3-FSS-SPM-V1.0	ROSETTA-LANDER 67P ROMAP 3 FSS SPM V1.0
RL-CAL-ROMAP-5-PHC-SPM-V1.0	ROSETTA-LANDER 67P ROMAP 5 PHC SPM V1.0



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RL-CAL-ROMAP-5-PDCS-SPM-V1.0	ROSETTA-LANDER 67P ROMAP 5 PDCS SPM V1.0
RL-C-ROMAP-5-SDL-SPM-V1.0	ROSETTA-LANDER 67P ROMAP 5 SDL SPM V1.0
RL-C-ROMAP-5-RBD-SPM-V1.0	ROSETTA-LANDER 67P ROMAP 5 RBD SPM V1.0
RL-C-ROMAP-5-FSS-SPM-V1.0	ROSETTA-LANDER 67P ROMAP 5 FSS SPM V1.0

The contents of the ROMAP data sets is as follows:

RL-CAL-ROMAP-x-CVP-xxx-Vx.x contains data from commisioning (2004)

RL-CAL-ROMAP-x-CRx-xxx-Vx.x contains data from cruise phases 1 to 6 (2004-2014)

RL-E-ROMAP-x-EARx-xxx-Vx.x contains data from the 3 Earth swing-by (03/2005, 11/2007, 11/2009)

RL-M-ROMAP-x-MARS-xxx-Vx.x contains data from the Mars swing-by (02/2007)

RL-A-ROMAP-x-AST1-xxx-Vx.x contains data from asteroid Steins fly by (2008)

RL-A-ROMAP-x-AST2-xxx-Vx.x contains data from asteroid Lutetia fly by (2010)

RL-C-ROMAP-x-SDL-xxx-Vx.x contains data from SDL comet phase (11/2014).

4.3 Data Product Design

The following types of data products are defined for ROMAP:

- Magnetometer data products: edited data (CODMAC level 2) in ADC units, preliminary calibrated data (CODMAC level 3) and final calibrated data (CODMAC level 5).
- Simple plasma monitor data products: edited data (CODMAC level 2), preliminary calibrated and final calibrated (CODMAC level 3).
- Housekeeping data. The HK data are common for MAG and SPM and include the pressure values.

All ROMAP data products have PDS detached labels.

4.3.1 Magnetometer Science Edited Data Product Design (Level 2)

A ROMAP edited Science file contains magnetic field vectors time stamped in UTC and ROMAP on board time.

4.3.1.1 File Characteristics Data Elements

The PDS file characteristic data elements for ROMAP MAG edited science data (level 2) are:

```
RECORD_TYPE = FIXED_LENGTH
RECORD_BYTES
FILE_RECORDS
LABEL_RECORDS
```

4.3.1.2 Data Object Pointers Identification Data Elements

The ROMAP SC edited data are organized as ASCII tables. The data object pointers (^TABLE) reference TAB files.

4.3.1.3 Instrument and Detector Descriptive Data Elements

The following data identification elements provide additional information about the ROMAP-MAG data products.

INSTRUMENT HOST NAME	= "ROSETTA-LANDER"
INSTRUMENT HOST ID	= RL
INSTRUMENT_ID	= ROMAP
INSTRUMENT NAME	= "ROSETTA LANDER MAGNETOMETER AND PLASMA MONITOR"
INSTRUMENT_TYPE	= {"FLUXGATE MAGNETOMETER", "ELECTROSTATIC ANALYZER",
—	"FARADAY CUP" }
DETECTOR_ID	= MAG



INSTRUMENT_MODE_ID = "N/A" INSTRUMENT_MODE_DESC = "N/A"

4.3.1.4 Data Object Definition

Each TAB file contains a five columns table with the raw magnetic field in Instrument frame and in ADC units: UTC, OBT, Bx, By, Bz.

OBJECT	=	TABLE
NAME	=	"ROMAP MAG RAWSC TABLE"
INTERCHANGE_FORMAT	=	ASCII
ROWS	=	
COLUMNS	=	5
ROW_BYTES	=	65
^STRUCTURE	=	"ROMAP MAG RAWSC.FMT"
END_OBJECT	=	TABLE

The structure of the TABLE object is described in the file ROMAP_MAG_RAWSC.FMT as follows:

/* Contents of i	format file "ROMAP_MAG_RAWSC.FMT" (Edited Science data) */
OBJECT NAME DATA_TYPE START_BYTE BYTES DESCRIPTION	<pre>= COLUMN = "UTC" = TIME = 1 = 23 = "This column represents the UTC</pre>
END_OBJECT	= COLUMN
OBJECT NAME DATA_TYPE START_BYTE BYTES UNIT FORMAT DESCRIPTION	<pre>= COLUMN = "OBT" = ASCII_REAL = 25 = 15 = SECOND = "F15.5" = "ROMAP 4 bytes counter representing the measurement time synchronized with Lander On Board Time. The time resolution is 0.03125 s"</pre>
END_OBJECT	= COLUMN
OBJECT NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	<pre>= COLUMN = "BX" = ASCII_INTEGER = 41 = 7 = "I7" = "ADC_COUNTS" = "Magnetic field X component, Uncalibrated raw data in instrument coordinates"</pre>
END_OBJECT	= COLUMN
OBJECT NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	<pre>= COLUMN = "BY" = ASCII_INTEGER = 49 = 7 = "I7" = "ADC_COUNTS" = "Magnetic field Y component, Uncalibrated raw data in instrument coordinates"</pre>
END_OBJECT	= COLUMN

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NAME DATA TYPE START BYTE BYTES FORMAT UNIT DESCRIPTION	<pre>= COLUMN = "BZ" = ASCII_INTEGER = 57 = 7 = "I7" = "ADC_COUNTS" = "Magnetic field Z compone Uncalibrated raw data in</pre>		dinates"
END_OBJECT =	= COLUMN		

4.3.1.5 Description of Instrument

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

4.3.2 Simple Plasma Monitor Science Edited Data Product Design (Level 2)

A ROMAP SPM edited science file contains data for several measurement cycles.

One cycle contains the following data (in raw or parameter modes):

Raw mode

SPM header:

- UTC,
- OBT,
- Status of SPM (from HK parameters in SC data frame)

16 (for different angles) energy distributions (counts and current) for lon1 and lon2 sensors,

1 energy distribution (current) for Faraday Cup sensors,

1 energy distribution (counts) for Electron sensors

Parameter mode

SPM header (same as for raw mode)

1 energy distribution (counts and currents) for lon1 and lon2 sensors,

1 angle distributions (counts and currents) for lon1 and lon2 sensors,

1 energy distribution (current) for Faraday Cup sensors (same format as for raw mode),

1 energy distribution (counts) for Electron sensors (same format as for raw mode)

Each measurement cycle is described by a "combined detached label" (.LBL) containing pointers to corresponding data files (.TAB).

Examples:

Raw mode:

SPM_FS2_041007004354_RAW.LBL

SPMR_FS2_041007004354_CN.TAB (ion energy-angle distribution, counts)SPMR_FS2_041007004354_CR.TAB (ion energy-angle distribution, current)SPMF_FS2_041007004354.TABSPME_FS2_041007004354.TAB(electron energy distribution, counts)

Param mode:

SPM_FS2_040514013124_PAR.LBLSPMP_FS2_040514013124_CNA.TAB (ion angle distribution, counts)SPMP_FS2_040514013124_CNE.TAB (ion energy distribution, counts)SPMP_FS2_040514013124_CRA.TAB (ion angle distribution, current)SPMP_FS2_040514013124_CRE.TAB (ion energy distribution, current)SPMP_FS2_040514013124_CRE.TAB (ion energy distribution, current)SPMF_FS2_040514013124_CRE.TAB (ion energy distribution, current)SPMF_FS2_040514013124_CRE.TAB (ion energy distribution, current)SPMF_FS2_040514013124_TABSPME_FS2_040514013124_TABSPME_FS2_040514013124_TAB



The table objects corresponding to the distributions are detailed in the following paragraphs.

4.3.2.1 File Characteristics Data Elements

The PDS file characteristic data elements for ROMAP SPM edited science data (level 2) are:

RECORD_TYPE = FIXED_LENGTH RECORD_BYTES FILE_RECORDS LABEL_RECORDS

4.3.2.2 Data Object Pointers Identification Data Elements

The ROMAP SPM SC edited data are organized as ASCII tables. The data object pointers (^TABLE) reference TAB files.

4.3.2.3 Instrument and Detector Descriptive Data Elements

The following data identification elements provide additional information about the ROMAP-SPM data products.

INSTRUMENT_HOST_NAME INSTRUMENT_HOST_ID INSTRUMENT_ID INSTRUMENT_NAME INSTRUMENT_TYPE	<pre>= "ROSETTA-LANDER" = RL = ROMAP = "ROSETTA LANDER MAGNETOMETER AND PLASMA MONITOR" = {"FLUXGATE MAGNETOMETER", "ELECTROSTATIC ANALYZER",</pre>
DETECTOR_ID	= SPM
INSTRUMENT_MODE_ID	= "N/A"
INSTRUMENT_MODE_DESC	= "N/A"

4.3.2.4 Data Object Definition

Each TAB file contains a header describing the Instrument status and the energy and angle distributions.

4.3.2.4.1 Ion spectrum definition (counts-energy-angle distribution), raw mode (channels 1 or 2)

OBJECT		ROMAP_SPM_RAW_ION_CN_TABLE
NAME	=	ROMAP_SPM_RAW_ION_CN
INTERCHANGE_FORMAT	=	ASCII
ROWS	=	256
^STRUCTURE	=	"ROMAP_SPM_RAW_ION_CN.FMT"
COLUMNS	=	28
ROW_BYTES	=	232
END OBJECT	=	ROMAP SPM RAW ION CN TABLE

The structure of the TABLE object is described in the file ROMAP_SPM_RAW_ION_CN.FMT as follows:

```
Contents of format file "ROMAP SPM RAW ION CN.FMT"
/*
                                                       */
             Ion spectrum definition
                                   (Level 3)
/*
                                                       */
      (I1CNT or I2CNT),
                    raw mode (channels 1 or 2)
/* Include the HEADER at the beginning of each measurement
                                                */
OBJECT
               = COLUMN
                = "UTC"
  NAME
  DATA TYPE
                = TIME
  START BYTE
                = 1
  BYTES
                = 23
                = "This column represents the UTC
  DESCRIPTION
                  Of the SPM spectrum in PDS standard format
                  YYYY-MM-DDThh:mm:ss.sss"
```

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END_OBJECT	= COLUMN		
	= COLUMN		
NAME	= "OBT"		
DATA_TYPE	= ASCII_REAL		
START_BYTE	= 25		
BYTES UNIT	= 15 = SECOND		
FORMAT	= "F15.5"		
DESCRIPTION	= "ROMAP 4 bytes counter i	representing the	measurement
	time synchronized with The time resolution is	Lander On Board	
END_OBJECT	= COLUMN		
OBJECT	= COLUMN		
NAME	= "MODE"		
DATA_TYPE	= CHARACTER = 42		
BYTES	= 9		
FORMAT UNIT	= "N/A" $= "N/A"$		
DESCRIPTION			
	raw or parameter"		
END_OBJECT	= COLUMN		
OBJECT	= COLUMN		
NAME	= "EXPOSITION_TIME" = CHARACTER		
START_BYTE	= 54		
BYTES	= 5		
FORMAT UNIT	= "N/A" $= "N/A"$		
DESCRIPTION	= "SPM exposition time set	tting.	
DESCICITION	short or long"	ccing.	
END_OBJECT	= COLUMN		
OBJECT	= COLUMN		
NAME	= "CALIBRATION"		
DATA_TYPE	= CHARACTER		
	= 62		
BYTES	= 8		
FORMAT UNIT	= "N/A" = "N/A"		
DESCRIPTION	= "SPM calibration status:	:	
	active or inactive"		
END_OBJECT	= COLUMN		
	= COLUMN		
NAME	= "CEM_SUPPLY" = ASCII_INTEGER = 72		
DATA_TYPE	= ASCII_INTEGER		
BYTES	= 12		
FORMAT	= 1 = "I1"		
UNIT	= "N/A"		
DESCRIPTION	<pre>= "N/A" = "SPM CEM supply setting;</pre>		
END_OBJECT	step number from 1 to 5 = COLUMN	D	
	= COLUMN		
NAME	= "RESOLUTION"		
DATA_TYPE	= CHARACTER		
START_BYTE	= 75 = 4		
FORMAT UNIT	= "N/A" = "N/A"		
DESCRIPTION	= "SPM resolution setting:	:	
	low or high"	-	

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END_OBJECT	= COLUMN		
OBJECT NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	<pre>= COLUMN = "ION_CHANNEL" = CHARACTER = 82 = 8 = "N/A" = "N/A" = "Ion channel status: Both_off Ion1 Ion2 Both on"</pre>		
END_OBJECT	= COLUMN		
OBJECT NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	<pre>= COLUMN = "EVEN_ODD" = CHARACTER = 93 = 8 = "N/A" = "Indicates whether all are transmitted (64 for 32 for low resolution) o alternatively. Takes the curp odd or full"</pre>	full resolution r even/odd energ	
END_OBJECT	even_odd or full" = COLUMN		
OBJECT NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION END_OBJECT	<pre>= COLUMN = "I1_X_ECLIPJ2000" = ASCII_REAL = 103 = 6 = "F6.3" = "N/A" = "X component of unit ve</pre>		h Ion 1 detector
	<pre>= COLUMN = "I1_Y_ECLIPJ2000" = ASCTI_REAL = 110 = 6 = "F6.3" = "N/A" = "Y component of unit ve</pre>	ctor aligned wit tes"	h Ion 1 detector
END_OBJECT	= COLUMN		
	<pre>= COLUMN = "I1_Z_ECLIPJ2000" = ASCTI_REAL = 117 = 6 = "F6.3" = "N/A" = "Z_component of unit ve in ECLIPJ2000 coordina</pre>	ctor aligned wit tes"	h Ion 1 detector
END_OBJECT			
OBJECT NAME DATA_TYPE START_BYTE	= COLUMN = "I2_X_ECLIPJ2000" = ASCII_REAL = 124		

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BYTES	= 6		
FORMAT	= "F6.3"		
UNIT	= "N/A"		
DESCRIPTION	= "X component of unit vec		Ion 2 detector
END_OBJECT =	in ECLIPJ2000 coordinat = COLUMN	tes"	
OBJECT =	= COLUMN		
NAME	= "I2_Y_ECLIPJ2000"		
DATA_TYPE	= ASCII_REAL		
START_BYTE	= 131 = 6		
BYTES FORMAT	= 6 = "F6.3"		
UNIT	= "N/A"		
DESCRIPTION	= "Y component of unit vec		Ion 2 detector
	in ECLIPJ2000 coordinat	tes"	
END_OBJECT =	= COLUMN		
OBJECT =	= COLUMN		
NAME	= "I2_Z_ECLIPJ2000"		
DATA_TYPE	= ASCII_REAL		
START_BYTE	= 138		
BYTES FORMAT	= 6 = "F6.3"		
UNIT	= F0.5 = "N/A"		
DESCRIPTION	= "Z component of unit vec	ctor aligned with	Ion 2 detector
	in ECLIPJ2000 coordinat		
END_OBJECT =	= COLUMN		
OBJECT =	= COLUMN		
NAME	= "EL X ECLIPJ2000"		
DATA_TYPE	= ASCII_REAL		
START_BYTE	= 145		
BYTES FORMAT	= 6 = "F6.3"		
UNIT	= "N/A"		
DESCRIPTION	= "X component of unit vec	ctor aligned with	electron
	detector in ECLIPJ2000	0 coordinates"	
END_OBJECT =	= COLUMN		
OBJECT =	= COLUMN		
NAME	= "EL Y ECLIPJ2000"		
DATA TYPE	= ASCTT REAL		
START_BYTE BYTES	= 152 = 6		
FORMAT	= 6 = "F6.3"		
UNIT	= "N/A"		
DESCRIPTION	= "Y component of unit vec		electron
END OBJECT =	detector in ECLIPJ2000 = COLUMN	0 coordinates"	
	COLUM		
	= COLUMN		
NAME DATA_TYPE	= "EL_Z_ECLIPJ2000"		
START BYTE	$= ASCII_REAL$ $= 159$		
BYTES	= 6		
	= "F6.3"		
UNIT	= "N/A"		
DESCRIPTION	= "Z component of unit vec detector in ECLIPJ2000		electron
END_OBJECT =	= COLUMN	U COULUINALES	
—			
OBJECT = NAME	= COLUMN = "FC X ECLIPJ2000"		
DATA TYPE	= FC_A_ECHIF02000 = ASCII REAL		
	= 166		
BYTES	= 6		

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FORMAT	= "F6.3"		
UNIT	= "N/A"		
DESCRIPTION	= "X component of unit vect	or aligned with	n Faraday cup
	in ECLIPJ2000 coordinate		
END_OBJECT	= COLUMN		
OBJECT	= COLUMN		
NAME	= "FC Y ECLIPJ2000"		
DATA TYPE	= ASCII REAL		
START BYTE	= 173		
BYTES	= 6		
FORMAT	= "F6.3"		
UNIT	= "N/A"		
DESCRIPTION	= "Y component of unit vect		n Faraday cup
	in ECLIPJ2000 coordinate	es"	
END_OBJECT	= COLUMN		
OBJECT	= COLUMN		
NAME	= "FC_Z_ECLIPJ2000"		
DATA_TYPE	= ASCII_REAL		
START_BYTE	= 180		
BYTES	= 6		
FORMAT	= "F6.3"		
UNIT	= "N/A"		
DESCRIPTION	= "Z component of unit vect in ECLIPJ2000 coordinate		i Faraday cup
END OBJECT	= COLUMN		
/* Add index and /* Index colu /* Type colu	umn : measurement number umn : measurement type (I1CNT c	or I2CNT)	*/ */ */
/* Add index and /* Index colu /* Type colu	type columns umn : measurement number	or I2CNT)	*/ */ */
/* Add index and /* Index cold /* Type cold /* ***********************************	<pre>cype columns imn : measurement number imn : measurement type (I1CNT c ************************************</pre>	or I2CNT)	*/ */ */
/* Add index and /* Index cold /* Type cold /* ***********************************	<pre>cype columns imn : measurement number imn : measurement type (I1CNT c ************************************</pre>	or I2CNT)	*/ */ */
/* Add index and /* Index cold /* Type cold /* ***********************************	<pre>type columns imn : measurement number imn : measurement type (I1CNT c ************************************</pre>	or I2CNT)	*/ */ */
/* Add index and /* Index cold /* Type cold /* ***********************************	<pre>type columns imn : measurement number imn : measurement type (I1CNT c ************************************</pre>	or I2CNT)	*/ */ */
/* Add index and /* Index cold /* Type cold /* ***********************************	<pre>type columns imn : measurement number imn : measurement type (I1CNT c ************************************</pre>	or I2CNT)	*/ */ */
<pre>/* Add index and /* Index cold /* Type cold /* ***********************************</pre>	<pre>cype columns imn : measurement number imn : measurement type (I1CNT c ************************************</pre>	or I2CNT)	*/ */ */
<pre>/* Add index and /* Index cold /* Type cold /* ***********************************</pre>	<pre>type columns imn : measurement number imn : measurement type (I1CNT c ************************************</pre>	or I2CNT)	*/ */ */
<pre>/* Add index and /* Index cold /* Type cold /* ***********************************</pre>	<pre>cype columns umn : measurement number umn : measurement type (I1CNT c ************************************</pre>	or I2CNT)	*/ */ */
<pre>/* Add index and /* Index cold /* Type cold /* ***********************************</pre>	<pre>cype columns umn : measurement number umn : measurement type (I1CNT c ************************************</pre>	or I2CNT)	*/ */ */
<pre>/* Add index and /* Index cold /* Type cold /* Type cold /* ***********************************</pre>	<pre>cype columns umn : measurement number umn : measurement type (I1CNT c ************************************</pre>	or I2CNT)	*/ */ */
<pre>/* Add index and /* Index cold /* Type cold /* Type cold /* ***********************************</pre>	<pre>cype columns umn : measurement number umn : measurement type (I1CNT c ************************************</pre>	or I2CNT)	*/ */ */
<pre>/* Add index and /* Index cold /* Type cold /* Type cold /* ***********************************</pre>	<pre>cype columns umn : measurement number umn : measurement type (I1CNT c ************************************</pre>	or I2CNT)	*/ */ */
<pre>/* Add index and /* Index cold /* Type cold /* Type cold /* ***********************************</pre>	<pre>type columns imn : measurement number imn : measurement type (I1CNT c ************************************</pre>	or I2CNT)	*/ */ */
<pre>/* Add index and /* Index cold /* Type cold /* Type cold /* ***********************************</pre>	<pre>type columns imn : measurement number imn : measurement type (I1CNT c ************************************</pre>	or I2CNT)	*/ */ */
<pre>/* Add index and /* Index cold /* Type cold /* Type cold /* ***********************************</pre>	<pre>type columns imn : measurement number imn : measurement type (I1CNT c ************************************</pre>	or I2CNT)	*/ */ */
<pre>/* Add index and /* Index cold /* Type cold /* Type cold /* ***********************************</pre>	<pre>type columns imn : measurement number imn : measurement type (I1CNT c ************************************</pre>	or I2CNT)	*/ */ */
<pre>/* Add index and /* Index cold /* Type cold /* Type cold /* ***********************************</pre>	<pre>type columns imn : measurement number imn : measurement type (I1CNT c ************************************</pre>	or I2CNT) ************************************	*/ */ */ * */
<pre>/* Add index and /* Index cold /* Type cold /* Type cold /* ***********************************</pre>	<pre>cype columns imn : measurement number imn : measurement type (I1CNT co ************************************</pre>	or I2CNT) ************************************	*/ */ */ * */
<pre>/* Add index and /* Index cold /* Type cold /* Type cold /* ***********************************</pre>	<pre>cype columns imn : measurement number imn : measurement type (I1CNT co ************************************</pre>	or I2CNT) ************************************	*/ */ */ * */
<pre>/* Add index and /* Index cold /* Type cold /* Type cold /* ***********************************</pre>	<pre>cype columns imn : measurement number imn : measurement type (I1CNT co ************************************</pre>	or I2CNT) ************************************	*/ */ */ * */
<pre>/* Add index and /* Index cold /* Type cold /* Type cold /* ***********************************</pre>	<pre>cype columns imn : measurement number imn : measurement type (I1CNT co ************************************</pre>	or I2CNT) ************************************	*/ */ */ * */
<pre>/* Add index and /* Index cold /* Type cold /* Type cold /* ***********************************</pre>	<pre>cype columns imn : measurement number imn : measurement type (I1CNT co ************************************</pre>	or I2CNT) ************************************	*/ */ */ * */
<pre>/* Add index and /* Index cold /* Type cold /* Type cold /* ***********************************</pre>	<pre>cype columns imn : measurement number imn : measurement type (I1CNT column) = COLUMN = "INDEX" = INTEGER = 187 = 5 = "I5" = "N/A" = "Measurement index" = COLUMN = COLUMN = COLUMN = TYPE" = CHARACTER = 194 = 5 = "N/A" = "Measurement type (I1CNT = COLUMN = "ENERGY" = ASCII_REAL = 201 = 7 = "F7.2"</pre>	or I2CNT) ************************************	*/ */ */ * */
<pre>/* Add index and /* Index cold /* Type cold /* Type cold /* ***********************************</pre>	<pre>cype columns imn : measurement number imn : measurement type (I1CNT column) = COLUMN = "INDEX" = INTEGER = 187 = 5 = "I5" = "N/A" = "Measurement index" = COLUMN = COLUMN = COLUMN = TYPE" = CHARACTER = 194 = 5 = "N/A" = "Measurement type (I1CNT = COLUMN = "ENERGY" = ASCII_REAL = 201 = 7 = "F7.2"</pre>	or I2CNT) ************************************	*/ */ */ * */
<pre>/* Add index and /* Index cold /* Type cold /* Type cold /* ***********************************</pre>	<pre>cype columns imn : measurement number imn : measurement type (I1CNT column) = COLUMN = "INDEX" = INTEGER = 187 = 5 = "I5" = "N/A" = "Measurement index" = COLUMN = COLUMN = COLUMN = TYPE" = CHARACTER = 194 = 5 = "N/A" = "Measurement type (I1CNT = COLUMN = "ENERGY" = ASCII_REAL = 201 = 7 = "F7.2"</pre>	or I2CNT) ************************************	*/ */ */ * */
<pre>/* Add index and /* Index cold /* Type cold /* Type cold /* ***********************************</pre>	<pre>cype columns imn : measurement number imn : measurement type (I1CNT co ************************************</pre>	or I2CNT) ************************************	*/ */ */ * */

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START_BYTE BYTES FORMAT	<pre>= "COUNTS_ELEVATION_1" = ASCII_REAL = 209 = 8 = "F8.2" = "CM**-2*S**-1" = "counts for elevation s COLUMN</pre>	step 1"	
OBJECT = NAME DATA_TYPE START_BYTE BYTES	<pre>COLUMN = "COUNTS_ELEVATION_2" = ASCII_REAL = 218 = 8 = "F8.2" = "CM**-2*S**-1" = "counts for elevation s COLUMN</pre>		
OBJECT = NAME DATA_TYPE START_BYTE BYTES	COLUMN = "COUNTS_ELEVATION_3" = ASCII REAL		
OBJECT = NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	COLUMN = "COUNTS_ELEVATION_4" = ASCII_REAL = 236 = 8 = "F8.2" = "CM**-2*S**-1" = "counts for elevation s COLUMN		
NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT	COLUMN = "COUNTS_ELEVATION_5" = ASCII_REAL = 245 = 8 = "F8.2" = "CM**-2*S**-1" = "counts for elevation s COLUMN	step 5"	
NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT	COLUMN = "COUNTS_ELEVATION_6" = ASCII_REAL = 254 = 8 = "F8.2" = "CM**-2*S**-1" = "counts for elevation s COLUMN	step 6 "	
OBJECT = NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT	<pre>COLUMN COLUMN COLU</pre>		

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END_OBJECT =	COLUMN		
NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	COLUMN = "COUNTS_ELEVATION_8" = ASCII_REAL = 272 = 8 = "F8.2" = "CM**-2*S**-1" = "counts for elevation COLUMN	step 8 "	
NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	<pre>COLUMN = "COUNTS_ELEVATION_9" = ASCII_REAL = 281 = 8 = "F8.2" = "CM**-2*S**-1" = "counts for elevation COLUMN</pre>	step 9 "	
NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	<pre>COLUMN = "COUNTS_ELEVATION_10" = ASCII_REAL = 290 = 8 = "F8.2" = "CM**-2*S**-1" = "counts for elevation COLUMN</pre>	step 10 "	
NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	COLUMN = "COUNTS_ELEVATION_11" = ASCII_REAL = 299 = 8 = "F8.2" = "CM**-2*S**-1" = "counts for elevation COLUMN	step 11 "	
OBJECT = NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION END_OBJECT =	<pre>COLUMN = "COUNTS_ELEVATION_12" = ASCII_REAL = 308 = 8 = "F8.2" = "CM**-2*S**-1" = "counts for elevation COLUMN</pre>	step 12 "	
OBJECT =			

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FORMAT UNIT DESCRIPTION END_OBJECT =	<pre>= "F8.2" = "CM**-2*S**-1" = "counts for elevation st = COLUMN</pre>	cep 14 "	
NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	<pre>= COLUMN = "COUNTS_ELEVATION_15" = ASCII_REAL = 335 = 8 = "F8.2" = "CM**-2*S**-1" = "counts for elevation st = COLUMN</pre>	ep 15 "	
OBJECT = NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION END_OBJECT	<pre>= COLUMN = "COUNTS_ELEVATION_16" = ASCII_REAL = 344 = 8 = "F8.2" = "CM**-2*S**-1" = "counts for elevation st = COLUMN</pre>	ep 16"	

4.3.2.4.2 Ion spectrum definition (current-energy-angle), raw mode (channels 1 or 2)

OBJECT	= 1	ROMAP SPM RAW ION CR TABLE
NAME	= 1	ROMAP_SPM_RAW_ION_CR
INTERCHANGE FORMAT	= 1	ASCII
ROWS	=	96
^STRUCTURE	=	"ROMAP SPM RAW ION CR.FMT"
COLUMNS	=	28
ROW BYTES	=	200
END_OBJECT	=	ROMAP_SPM_RAW_ION_CR_TABLE

The structure of the TABLE object is described in the file ROMAP_SPM_RAW_ION_CR.FMT as follows:

```
/*
             Contents of format file "ROMAP_SPM_RAW_ION_CR.FMT"
                                                                */
/*
                                                              */
               Ion spectrum definition (Level 2)
.
/*
                                                              */
       (I1CRT or I2CRT), raw mode (channels 1 or 2)
/* Include the HEADER at the beginning of each measurement ^{\prime} ^{\prime}
OBJECT
                  = COLUMN
                 = "UTC"
   NAME
   DATA TYPE
                  = TIME
   START_BYTE
                  = 1
                  = 23
   BYTES
   DESCRIPTION
                  = "This column represents the UTC
                    Of the SPM spectrum in PDS standard format
                    YYYY-MM-DDThh:mm:ss.sss"
END OBJECT
                 = COLUMN
OBJECT
                 = COLUMN
                 = "OBT"
   NAME
   DATA TYPE
                = ASCII_REAL
   START_BYTE
                 = 25
                 = 15
   BYTES
   UNIT
                 = SECOND
                 = "F15.5"
   FORMAT
                 = "ROMAP 4 bytes counter representing the measurement
   DESCRIPTION
                    time synchronized with Lander On Board Time.
                    The time resolution is 0.03125 s"
```

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END_OBJECT =	COLUMN		
OBJECT NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	<pre>= COLUMN = "MODE" = CHARACTER = 42 = 9 = "N/A" = "N/A" = "SPM mode: raw or parameter"</pre>		
END_OBJECT	= COLUMN		
OBJECT NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	<pre>= COLUMN = "EXPOSITION_TIME" = CHARACTER = 54 = 5 = "N/A" = "N/A" = "SPM exposition time set</pre>	ting:	
END_OBJECT	short or long" = COLUMN		
OBJECT NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	<pre>= COLUMN = "CALIBRATION" = CHARACTER = 62 = 8 = "N/A" = "N/A" = "SPM calibration status: active or inactive"</pre>		
END_OBJECT	= COLUMN		
OBJECT NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	<pre>= COLUMN = "CEM_SUPPLY" = ASCII_INTEGER = 72 = 1 = "I1" = "N/A" = "SPM CEM supply setting:</pre>		
END_OBJECT	step number from 1 to 5 = COLUMN	, ''	
DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	<pre>= COLUMN = "RESOLUTION" = CHARACTER = 75 = 4 = "N/A" = "N/A" = "SPM resolution setting: low or high"</pre>		
END_OBJECT	= COLUMN		
FORMAT	<pre>= COLUMN = "ION_CHANNEL" = CHARACTER = 82 = 8 = "N/A" = "N/A" = "Ion channel status: Both_off Ion1</pre>		

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END OBJECT	Ion2 Both_on" = COLUMN		
—	~~~~~		
OBJECT NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	<pre>= COLUMN = "EVEN ODD" = CHARACTER = 93 = 8 = "N/A" = "N/A" = "Indicates whether all a are transmitted (64 for 32 for low resolution) of alternatively. Takes the even odd or full"</pre>	full resolution r even/odd energ	
END_OBJECT	= COLUMN		
/* Add index and ty /* Index colum /* Type colum	<pre>************************************</pre>	r CRT)	*/ */ */
OBJECT NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	<pre>= COLUMN = "INDEX" = INTEGER = 103 = 5 = "I5" = "N/A" = "Measurement index"</pre>		
END_OBJECT	= COLUMN		
NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT	<pre>= COLUMN = "TYPE" = CHARACTER = 110 = 5 = "N/A" = "N/A" = "Measurement type (I1CR' = COLUMN</pre>	I or I2CRT)"	
/* *************	* * * * * * * * * * * * * * * * * * * *	* * * * * * * * * * * * * * *	*/
DATA_TYPE START_BYTE BYTES FORMAT UNIT	<pre>= COLUMN = "ENERGY_BIN" = INTEGER = 117 = 2 = "I2" = "N/A" = "Energy bin number" = COLUMN</pre>		
OBJECT NAME DATA_TYPE START_BYTE BYTES	= COLUMN		
DESCRIPTION END_OBJECT	= "Current for elevation = COLUMN	step 1"	
OBJECT	= COLUMN		



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END_OBJECT =	= COLUMN		
START_BYTE BYTES FORMAT	<pre>= "CURRENT_ELEVATION_9" = INTEGER = 160 = 4 = "I4" = "ADC_UNITS" = "Current for elevation</pre>	step 9 "	
- OBJECT = DATA_TYPE START_BYTE BYTES FORMAT	<pre>= COLUMN = "CURRENT_ELEVATION_10" = INTEGER = 165 = 4 = "I4" = "ADC_UNITS" = "Current for elevation</pre>	step 10 "	
START_BYTE BYTES FORMAT UNIT DESCRIPTION	<pre>= COLUMN = "CURRENT_ELEVATION_11" = INTEGER = 170 = 4 = "I4" = "ADC_UNITS" = "Current for elevation = COLUMN</pre>	step 11 "	
NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	<pre>= COLUMN = "CURRENT_ELEVATION_12" = INTEGER = 175 = 4 = "I4" = "ADC_UNITS" = "Current for elevation = COLUMN</pre>	step 12 "	
OBJECT = NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION END_OBJECT =	<pre>= COLUMN = "CURRENT_ELEVATION_13" = INTEGER = 180 = 4 = "I4" = "ADC_UNITS" = "Current for elevation = COLUMN</pre>	step 13 "	
OBJECT = NAME DATA_TYPE START_BYTE BYTES DYTES	= COLUMN = "CURRENT_ELEVATION_14" = INTEGER = 185		
OBJECT = NAME DATA_TYPE START_BYTE	= COLUMN = "CURRENT_ELEVATION_15" = INTEGER		

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FORMAT UNIT DESCRIPTION END_OBJECT	<pre>= "I4" = "ADC_UNITS" = "Current for elevation = COLUMN</pre>	step 15 "	
OBJECT NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION END_OBJECT	<pre>= COLUMN = "CURRENT_ELEVATION_16" = INTEGER = 195 = 4 = "I4" = "ADC_UNITS" = "Current for elevation = COLUMN</pre>		

4.3.2.4.3 Ion spectrum definition (counts-energy distribution), parameter mode (channels 1 or 2)

OBJECT	= ROMAP SPM PAR ION CNE TABLE
NAME	= ROMAP_SPM_PAR_ION_CNE
INTERCHANGE_FORMAT	= ASCII
ROWS	= 192
^STRUCTURE	= "ROMAP SPM PAR ION CNE.FMT"
COLUMNS	= 14
ROW BYTES	= 148
END_OBJECT	= ROMAP_SPM_PAR_ION_CNE_TABLE

The structure of the TABLE object is described in the file ROMAP_SPM_PAR_ION_CNE.FMT as follows:

/* Contents of format file " ROMAP_SPM_PAR_ION_CNE.FMT" */ /* */ (Level 2) Ion spectrum definition . / * */ (I1CNTE or I2CNTE), parameter mode (channels 1 or 2) /* Include the HEADER at the beginning of each measurement */ OBJECT = COLUMN = COLUM = "UTC" = TIME = 1 NAME DATA TYPE START BYTE = 1 BYTES = 23 DESCRIPTION = "This column represents the UTC Of the SPM spectrum in PDS standard format YYYY-MM-DDThh:mm:ss.sss" END OBJECT = COLUMN OBJECT = COLUMN = "OBT" NAME DATA TYPE = ASCII REAL START BYTE = 25 BYTES = 15 UNIT = SECOND = "F15.5" FORMAT FORMAT = "F15.5" DESCRIPTION = "ROMAP 4 bytes counter representing the measurement time synchronized with Lander On Board Time. The time resolution is 0.03125 s" END OBJECT = COLUMN OBJECT = COLUMN = "MODE" NAME = CHARACTER DATA TYPE START BYTE = 42 = 9 BYTES = "N/A" FORMAT UNIT = "N/A" DESCRIPTION = "SPM mode:



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	raw or parameter"
END_OBJECT	= COLUMN
OBJECT NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	<pre>= COLUMN = "EXPOSITION_TIME" = CHARACTER = 54 = 5 = "N/A" = "N/A" = "SPM exposition time setting: short or long"</pre>
END_OBJECT	= COLUMN
START_BYTE BYTES	= 8 = "N/A" = "N/A"
END_OBJECT	= COLUMN
OBJECT NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	<pre>= COLUMN = "CEM_SUPPLY" = ASCII_INTEGER = 72 = 1 = "I1" = "N/A" = "SPM CEM supply setting: step number from 1 to 5"</pre>
END_OBJECT	= COLUMN
DATA_TYPE START_BYTE BYTES	= 4 = "N/A" = "N/A"
OBJECT NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	<pre>= COLUMN = "ION_CHANNEL" = CHARACTER = 82 = 8 = "N/A" = "N/A" = "Ion channel status: Both_off Ion1 Ion2 Both_on" = COLUMN</pre>
END_OBJECT	
OBJECT NAME DATA_TYPE START_BYTE BYTES FORMAT	= COLUMN = "EVEN_ODD" = CHARACTER = 93 = 8 = "N/A"

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UNIT DESCRIPTION	<pre>= "N/A" = "Indicates whether all e are transmitted (64 for f 32 for low resolution) or alternatively. Takes the over odd or full"</pre>	full resolution a even/odd energe	
END_OBJECT	even_odd or full" = COLUMN		
/* *************	* * * * * * * * * * * * * * * * * * * *	****	* */
/* Type column	<pre>e columns : measurement number : measurement type (I1CNTE ************************************</pre>		*/ */ */ * */
OBJECT =	COLUMN		
NAME	= "INDEX"		
DATA_TYPE	= INTEGER		
START_BYTE BYTES	= 103 = 5		
FORMAT	= "I5"		
UNIT	= "N/A"		
DESCRIPTION	= "Measurement index"		
END_OBJECT =	COLUMN		
OBJECT =	COLUMN		
NAME	= "TYPE"		
DATA_TYPE	= CHARACTER		
START_BYTE	= 110		
BYTES	= 6		
FORMAT UNIT	= "N/A" = "N/A"		
DESCRIPTION	= "Measurement type (I1CNI	'E or I2CNTE)"	
	COLUMN	,	
/* **************	****	*****	* /
OBJECT	= COLUMN		
NAME DATA TYPE	= "ENERGY_BIN" = INTEGER		
START BYTE	= 118		
BYTES	= 2		
FORMAT	= "I2"		
UNIT	= "N/A"		
DESCRIPTION END_OBJECT	<pre>= "I2" = "N/A" = "Energy bin number" = COLUMN</pre>		
_			
OBJECT NAME	= COLUMN = "COUNTS"		
DATA TYPE	= INTEGER		
DATA_TYPE START_BYTE	= 121		
BYTES	= 8		
FORMAT	= "I8" - "ADC UNITEC"		
UNIT DESCRIPTION	<pre>= "ADC_UNITS" = "Sum of counts for eleva = COLUMN</pre>	tion stens 1 to	16"
END_OBJECT	= COLUMN		10
OBJECT	= COLUMN		
	= "OVERFLOW FLAG"		
DATA TYPE	= CHARACTER		
START_BYTE			
BYTES	= 16 = "N/A"		
FORMAT UNIT	= "N/A" = "N/A"		
DESCRIPTION	= "String of 16 characters	; each characte	er corresponds
	to an elevation step an values :	nd may take one o	
	0 : No overfl	WO.	



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END_OBJECT	= COLUMN		
OBJECT NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	<pre>= COLUMN = "CALIBRATION" = CHARACTER = 62 = 8 = "N/A" = "N/A" = "SPM calibration status: active or inactive"</pre>		
END_OBJECT	= COLUMN		
OBJECT NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	= 72 - = 1 = "I1" = "N/A" = "SPM CEM supply setting:		
END_OBJECT	step number from 1 to 5 = COLUMN	"	
OBJECT NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	<pre>= COLUMN = "RESOLUTION" = CHARACTER = 75 = 4 = "N/A" = "N/A" = "SPM resolution setting:</pre>		
END_OBJECT	= COLUMN		
OBJECT NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	<pre>= COLUMN = "ION_CHANNEL" = CHARACTER = 82 = 8 = "N/A" = "N/A" = "Ion channel status: Both_off Ion1 Ion2 Both_on"</pre>		
END_OBJECT	= COLUMN		
OBJECT NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	<pre>= COLUMN = "EVEN_ODD" = CHARACTER = 93 = 8 = "N/A" = "N/A" = "Indicates whether all e are transmitted (64 for f 32 for low resolution) or alternatively. Takes the own odd or full"</pre>	ull resolution even/odd energ	
END_OBJECT	even_odd or full" = COLUMN		
/* Add index and typ	<pre>************************************</pre>	* * * * * * * * * * * * * * * *	* */ */ */



4.3.2.4.5 Ion spectrum definition (counts-angle distribution), parameter mode (channels 1 or 2)



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The structure of the TABLE object is described in the file ROMAP_SPM_PAR_ION_CNA.FMT as follows:

/* Contents of format file " ROMAP SPM PAR ION CNA.FMT" */ /* */ Ion spectrum definition (Level 2) /* */ (I1CNTA or I2CNTA), parameter mode (channels 1 or 2) /* Include the HEADER at the beginning of each measurement */ OBJECT = COLUMN = "UTC" NAME DATA_TYPE = TIME START BYTE = 1 = 23 BYTES DESCRIPTION = "This column represents the UTC Of the SPM spectrum in PDS standard format YYYY-MM-DDThh:mm:ss.sss" END OBJECT = COLUMN OBJECT = COLUMN = "OBT" NAME = ASCII REAL DATA TYPE START BYTE = 25 BYTES = 15 = SECOND UNIT = "F15.5" FORMAT DESCRIPTION = "ROMAP 4 bytes counter representing the measurement time synchronized with Lander On Board Time. The time resolution is 0.03125 s" END OBJECT = COLUMN OBJECT = COLUMN = "MODE" NAME = CHARACTER DATA TYPE START_BYTE = 42 = 9 BYTES = "N/A" FORMAT = "N/A" UNTT DESCRIPTION = "SPM mode: raw or parameter" = COLUMN END OBJECT OBJECT = COLUMN = "EXPOSITION TIME" NAME = CHARACTER DATA_TYPE START_BYTE = 54 = 5 BYTES = "N/A" FORMAT = "N/A" UNIT = "SPM exposition time setting: DESCRIPTION short or long" END OBJECT = COLUMN OBJECT = COLUMN = "CALIBRATION" NAME = CHARACTER DATA TYPE START BYTE = 62 BYTES = 8 = "N/A" FORMAT = "N/A" UNIT = "SPM calibration status: DESCRIPTION active or inactive" END OBJECT = COLUMN OBJECT = COLUMN

<pre>NAME = "TEM SUPPLY" OPTINT FYTE = TOTITUTEDER OPTINT FYTE = TOTITUTEDER OPTINT FYTE = TOTITUTEDER OPTINT FYTE = TOTITUTEDER OPTINT = "NA" DESCRIPTION = "NA" DESCRIPTION = "NA" DESCRIPTION = "SPM TEAL to 5" END_OBJECT = COLUMN NAME = "SEQUITION" DATA TYPE = CHARACTER START_FYTE = TO START_FYTE = TO START_FYTE = TO ONTACT = COLUMN NAME = "TON CHANNEL" DATA TYPE = COLUMN NAME = "TONCHANNEL" DATA TYPE = COLUMN NAME = "TONCHANNEL" DATA TYPE = COLUMN NAME = "TYPE" OFFICE = COLUMN NAME = "TYPE" NEESCHIPTION = TONCHANNEL" DATA TYPE = COLUMN NAME = COLUMN</pre>	GEP Braunschweig	ne ROMAP EAICD	Document No. Issue/Rev. No. Date Page	RO-ROL-ROMAP-EAICD 1 / 1 14-July-2016 58
START BYTE = 72 WYTE = 1 FORMAT = "11" DESCRIPTION = "SPM CRM supply sotling: step number from 1 to 3" END_OBJECT = COLUMN CALTA TYPE = CHARACTER START BYTE = 75 SYTES = 4 NOMAT = "N/A" DESCRIPTION = "SEM coslition setting: DESCRIPTION = "SAA" DESCRIPTION = "N/A" DESCRIPTION = "N/A" DESCR		= "CEM_SUPPLY"		
<pre>NYTES⁵ = 1 FORMAC = 'I' CUTT = ''N/A" DESCRIPTION "SAN CEN supply solling: step number from 1 to 5" END_OBJECT = COLUMN OWN = 'ENSOLUTION" DATA TYPE = CHERAKATER STATE PATE = 75 SYTES = 4 FORMAC = 'N/A" UNIT = 'N/A" DESCRIPTION = 'N/A" UNIT = ''N/A" DESCRIPTION = ''N/A" DESCRIPTION = ''N/A" UNIT = ''N/A" DESCRIPTION = ''N/A" UNIT = ''N/A" UNIT = ''N/A" DESCRIPTION = ''N/A" UNIT = ''N/A" UNIT = ''N/A" DESCRIPTION = ''N/A" UNIT = ''N/A" DESCRIPTION = ''N/A" UNIT = ''N/A" DESCRIPTION = ''N/A" UNIT = ''N/A" DESCRIPTION = ''N/A" UNIT = ''N/A" UNIT = ''N/A" DESCRIPTION = ''N/A" UNIT = ''N/A" UNIT = ''N/A" DESCRIPTION = ''LIGATER between all energies alternativel(64 for full resolution and 32 for low resolution) or even/odd energies alternativel(64 for full resolution and 32 for low resolution) or even/odd energies alternativel(64 for full resolution and 32 for low resolution) or even/odd energies alternativel(1017) = ''N/A" DESCRIPTION = ''INDESCRIPTION = ''/ '' Index column: measurement number */ '' Index column: measurement number */ '' Index column : measurement number */ '' Index column : measurement number */ '' Index column = ''N/A" DESCRIPTION = ''INDESCRIPTION = '''INDESCRIPTION = '''' ''' DESCRIPTION = ''''''''''' DESCRIPTION = '''''''''''''''''''''''''''''''''''</pre>				
<pre>POMAAT = "II" UNIT = "N/A" DESCRIPTION = "SPM CEM supply setting: DESCRIPTION = COLUMN OBJECT = COLUMN DATA TYPE = CHEARACTER START BYTE = CARRACTER START BYTE = CARRACTER START BYTE = CARRACTER START BYTE = COLUMN DESCRIPTION = "SPM resolution setting: LOW OF high" END_OBJECT = COLUMN DESCRIPTION = "ION CHANNEL" DESCRIPTION = "ION CHANNEL" DATA TYPE = CHARACTER START_STE = 82 FYTES = 4 FORMAT = "N/A" DESCRIPTION = "ION CHANNEL" DESCRIPTION = "ION CHANNEL" DESCRIPTION = "N/A" DESCRIPTION = "N/A"</pre>	_			
<pre>NMT = "%/" DESCRIPTION = "%FM CEM supply setLing: stop number from 1 to 5" ND_GENET = COLUMN NAME = "RESOLUTION" DESCRIPTION = "%LA" UNIT = "COLUMN NAME = "COLUMN NAME = "COLUMN NAME = "COLUMN NAME = "%LA" UNIT = "WA" UNIT = "UNIT = "%LA" UNIT = "WA" UNIT = "UNIT = "%LA" UNIT = "UNIT = = UNIT =</pre>				
DESCRIPTION = "SEW CEM supply seting: step number from 1 to 5" END_GBJECT = COLUMN ORJECT = COLUMN DATA TYPE = CRAACTER START PITE = 75 STRET = 4 COLUMN DESCRIPTION = "N/A" DESCRIPTION = "STM resolution setting: LOW or high" END_GBJECT = COLUMN ORJECT = COLUMN ORJECT = COLUMN ORJECT = COLUMN ORJECT = COLUMN NAME = "I'ON CEANNEL" DATA TYPE = CRAARCTER START BYTE = 8 FORWAT = "N/A" ONIT = "START ENTE = 3 START BYTE = 9 START BYTE = 9 START BYTE = 9 START BYTE = 32 COLUMN ONAME = "SVEN ODD" NAME = "SVEN ODD" NAME = "SVEN ODD" START BYTE = 92 START BYTE = 92 START BYTE = 32 START BYTE = 32 COLUMN ONJECT = COLUMN (4 for full resolution and 32 for low resolution or even/odd energies cven odd or full" FND_OBJECT = COLUMN (4 for full resolution and 32 for low resolution or even/odd energies cven odd or full" FND_OBJECT = COLUMN (5 FT = COLUMN NAME = "NAA" ONJECT = COLUMN (5 FT = COLUMN NAME = "NAA" ONJECT = COLUMN (5 FT = COLUMN				
<pre>step number from 1 to 5" END_OBJECT = COLUMN OSJECT = COLUMN DATA TYPE = COLAAATOR DATA TYPE = CHAPACTOR START_BYTE = 7 START_BYTE = 00LUMN OSJECT = COLUMN NAME = "ION CHAPMEL" DATA TYPE = COLAMATOR START_BYTE = 8 START_BYTE = 9 START_STAR = "WAA" UNIT = "WAA" UNIT = "WAA" START_STE = 9 START_STE = 9 START_STE = 9 START_STE = 8 START_STE = 8 START_STE = 8 START_STE = 9 START_STE = 9 START_STE = 9 START_STE = 10 START_STE = 103 START_ST</pre>				
END_OBJECT = COLUMN NAME "PESOJUTION" DATA_TYPE = CHARACTER START_BYTE = T75 BYTES = 4 FORMAT = "%/A" UNIT = "%/A" UNIT = "%/A" DESCRIPTION = "SEM resolution setting: LOW Or high" END_OBJECT = COLUMN OBJECT = COLUMN OBJECT = COLUMN NAME = "N/A" UNIT = "%/A" UNIT = "%/A" DESCRIPTION = "Ton channel status: Both_off Ion1 Ion2 Both_on" END_OBJECT = COLUMN NAME = "YVEN_ODD" DATA_TYPE = CHARACTER START_BYTE = 93 SYTEST = 0 FORMAT = %/A" UNIT = "%/A" UNIT = "%/A" COMPONENT = 0 START_BYTE = 93 SYTEST = 0 FORMAT = "%/A" UNIT = "%/A" UNIT = "%/A" COMPONENT = "%/A" COMPONENT = 0 START_BYTE = 0 START_BYTE = 0 START_TYPE = CHARACTER START_BYTE = 0 START_TYPE = CHARACTER START_BYTE = 0 START_BYTE = 0 START_TYPE = CHARACTER START_BYTE = 0 START_TYPE = CHARACTER START_BYTE = 0 START_TYPE = CHARACTER START_BYTE = 103 START_BYTE = 0CHUMN CALUER COLUMN = "%CAURACTER START_BYTE = 103 START_BYTE = 103 START_BYTE = 103 START_BYTE = 0CHUMN CALUER COLUMN = "%CAURACTER START_BYTE = 103 START_BYTE = 103 START_BYTE = 103 START_BYTE = 0CHUMN CALUER COLUMN = "%CAURACTER START_BYTE = 103 START_BYTE = 103 START_BY	DESCRIPTION			
NAME = "RESOLUTION" DATA TYPE = CHARACTER START BYTE = 75 BYTES = 4 FORMAT = "N/A" DESCRIPTION = "SM resolution setting: LOW of high" SND_OBJECT = COLUMN OBJECT = COLUMN NAME = "ION_CHANNEL" DATA TYPE = CHARACTER START BYTE = 82 BYTES = 8 FORMAT = "N/A" UNIT = "N/A" UNIT = "N/A" UNIT = "N/A" DATA_TYPE = CHARACTER START BYTE = 0 Both_off Ion1 Ion2 Both_off Ion2 Both_off Ion2 BOTA_TFF START BYTE = 3 PTOSS = 8 FORMAT = "SVEN ODD" DATA_TYPE = CHARACTER START BYTE = 3 PTOSS = 8 PTOSS = 7 PTOSS	END_OBJECT		5 5	
DATA TYPE = CHARACTER START BYTE 75 BYTSS = 4 FORMAT = "N/A" UNIT = "N/A" UNIT = "N/A" DESCRIPTION = COLUMN NAME = "ION CHANNEL" DATA TYPE = CHARACTER START BYTE = 82 BYTSS = 8 FORMAT = "N/A" UNIT = "N/A" DESCRIPTION = "IOn channel status: Roth_off Ion1 Ion2 Both on" START BYTE = 93 SYTART BYTE = 93 SYTART BYTE = 93 BYTSS = 8 FORMAT = "N/A" UNIT = "N/A" DESCRIPTION = "IOn channel status: Roth_off Ion1 Ion2 Both on" START BYTE = 93 SYTART BYTE = 93 SYTART BYTE = 93 SYTART BYTE = 0 SYTART BYTE = 0 SYTART BYTE = 0 START = "N/A" UNIT = "N/A" DESCRIPTION = "Indicates whether all energies alternatively. Takes the values: even_odd or full" SND_OBJECT = COLUMN /* INT = COLUMN = measurement number */ /* Type columns = measurement number */ /* Type columns = measurement number */ /* Type column = measurement number */ /* Type colum	OBJECT	= COLUMN		
<pre>START_BYTE = 75 START_BYTE = 75 START_BYTE = 75 START_BYTE = 75 START_FORMAT = "N/A" UNIT = "N/A" DESCRIPTION = "SFM resolution setting: Low or high" END_OBJECT = COLUMN NAME = "ION_CHANNEL" DATA_TYPE = CHARACTER START_BYTE = 82 STRSS = 8 FORMAT = "N/A" UNIT = "N/A" OBJECT = COLUMN OBJECT = COLUMN OBJECT = COLUMN START_BYTE = S3 STRSS = 6 FORMAT = "N/A" UNIT = "N/A" UNIT = "N/A" UNIT = "N/A" STRAT_BYTE = CHARACTER STRAT_BYTE = S3 STRSS = 6 FORMAT = "N/A" UNIT = "N</pre>		= "RESOLUTION"		
<pre>BYTES⁻ = 4 FORMAT = "N/A" UNIT = "N/A" UNIT = "N/A" DESCRIPTION = "SPM resolution setting: low or high" END_OBJECT = COLUMN NAME = "ION CHANNEL" DATA_TYPE = E2 BYTES = 8 FORMAT = "N/A" UNIT = "N/A" DESCRIPTION = "ION channel status: Both_off Ion1 Ion2 Both_off Ion2 Both_off Both_off START_BYTE = 93 BTTES = 8 FORMAT = "N/A" UNIT = "N/A" UNIT = "N/A" DESCRIPTION = "INDEX" START_BYTE = 93 BTTES = 8 FORMAT = "N/A" UNIT = "N/A" UNIT = "N/A" DESCRIPTION = "Indicates whether all energies are transmitted (64 for full resolution and 32 for low resolution) or even/odd energies alternatively. Takes the values:</pre>				
<pre>FORMAT = "N/A" UNIT = "N/A" DESCRIPTION = "SPM resolution setting: low or high" END_OBJECT = COLUMN OBJECT = COLUMN NAME = "YON_CHANNEL" DATA_TYPE = CHARACTER START BYTE = 62 BYTES = 8 FORMAT = "N/A" UNIT = "N/A" UNIT = "N/A" UNIT = "N/A" DESCRIPTION = "Ton channel status: Both_Off Ion1 Ion2 Both_Off Ion1 Ion2 Both_Off Ion1 Ion2 Both_Off Ion1 FORMAT = "VA" UNIT = "N/A" UNIT = "N/A" UNIT</pre>				
UNIT = "N/A" DESCRIPTION = "SPM resolution setting: Low or high" END_OBJECT = COLUMN NAME = "ION CHANNEL" DATA TYPE = CHARACTER START MYTE = 82 PORMAT = "N/A" UNIT = "N/A" UNIT = "N/A" UNIT = "N/A" DESCRIPTION = "SUCH ODD" DATA TYPE = COLUMN NAME = COLUMN NAME = "SUCH ODD" DATA TYPE = CHARACTER START SYTE = 93 BYTES = 8 PORMAT = "N/A" UNIT = "N/A" OBJECT = COLUMN /*				
DESCRIPTION = "SPM resolution setting: low or bigh" END_OBJECT = COLUMN OBJECT = COLUMN DATA_TYPE = CHARACTER START FATE = 82 BYTES = 8 FORMAT = "N/A" UNIT = "N/A" UNIT = "N/A" UNIT = "N/A" DESCRIPTION = "Concentration of the setting: Both off Ion1 Ion2 Both on" END_OBJECT = COLUMN OBJECT = COLUMN OBJECT = COLUMN OBJECT = "N/A" UNIT = "N/A" OBJECT = COLUMN /* total and type columns */ /* Type column : measurement number */ /* Type column = "N/A" DESCRIPTION = "N/A" DESCRIPTION = "Neasurement index" SD_COBJECT = COLUMN				
<pre>low or high" END_OBJECT = COLUMN NAME = "ION_CHANNEL" DATA_TYPE = CHARACTER START_BYTE = 82 BYTES = 8 FORMAT = "N/A" UNIT = "N/A" DESCRIPTION = "Ion channel status: Both_off Ion1 Ion2 Both_on" END_OBJECT = COLUMN OBJECT = COLUMN NAME = "EVEN ODD" DATA_TYPE = CHARACTER START_BYTE = 93 BYTES = 8 FORMAT = "N/A" UNIT = "N/A" UNIT = "N/A" UNIT = "N/A" DESCRIPTION = "Indicates whether all energies are transmitted (64 for full resolution and 32 for low resolution) or even/odd energies alternatively. Takes the values: even odd or full" END_OBJECT = COLUMN /* Index column : measurement number // /* Index column : measurement number // /* Index column : measurement number // /* TINES = S FORMAT = "INDEX" DATA_TYPE = INTEGR START_DYTE = 103 BYTES = S FORMAT = "N/A" DESCRIPTION = "Measurement index" END_OBJECT = COLUMN</pre>				
CBJECT = COLUMN NAME = "ION CHANNEL" DATA TYPE = CHARACTER START_BYTE = 82 BITES = 8 FORMAT = "N/A" UNIT = "N/A" UNIT = "N/A" DESCRIPTION = "Ion channel status: Both_off Ion1 Ion2 Both_or" END_OBJECT = COLUMN OBJECT = COLUMN NAME = "EVEN ODD" DATA TYPE = CHARACTER START_BYTE = 93 BITES = 8 FORMAT = "N/A" UNIT = "N/A" DESCRIPTION = "Indicates whether all energies are transmitted (64 for full resolution and 32 for low resolution) or even/odd energies alternatively. Takes the values: even odd or full" END_OBJECT = COLUMN /* Index column : measurement number */ /* Index column : measurement number */ /* Tindex column = "Tindex" DATA TYPE = COLUMN	DESCRIPTION			
NAME = "ION_CHANNEL" DATA TYPE = CHARACTER START BYTE = 82 BYTES = 8 PORMAT = "N/A" UNIT = "N/A" UNIT = "ION channel status: Both_off Ion1 Ion2 Both_on" END_OBJECT = COLUMN NAME = "EVEN DOD" DATA_TYPE = CHARACTER START_BITE = 93 BYTES = 8 FORMAT = "N/A" DESCRIPTION = "Indicates whether all energies are transmitted (64 for full resolution and 32 for low resolution) or even/odd energies alternatively. Takes the values: even_odd or full" END_OBJECT = COLUMN /*	END_OBJECT	= COLUMN		
DATA TYPE = CHARĀCTER START BYTE = 82 BYTES = 8 FORMAT = "N/A" UNIT = "N/A" UNIT = "N/A" DESCRIPTION = "Ion channel status: Both_off Ion1 Ton2 Both_on" END_OBJECT = COLUMN NAME = "EVEN_ODD" DATA TYPE = CHARACTER START BYTE = 93 BYTES = 8 FORMAT = "N/A" UNIT = "N/A" UNIT = "N/A" DESCRIPTION = "Indicates whether all energies are transmitted (64 for full resolution and 32 for low resolution) or even/odd energies alternatively. Takes the values: even_odd or full" END_OBJECT = COLUMN /* ***********************************	OBJECT			
<pre>START BYTE = 82 BYTES = 8 FORMAT = "N/A" UNIT = "N/A" UNIT = "N/A" UNIT = "Ion channel status: Both_off Ion1 Ion2 Both_on" END_OBJECT = COLUMN OBJECT = COLUMN OBJECT = COLUMN OBJECT = COLUMN OBJECT = N/A" UNIT = "N/A" OBJECT = COLUMN /* ***********************************</pre>				
<pre>BYTES⁻ = 8 FORMAT = "N/A" UNIT = "N/A" DESCRIPTION = "Ion channel status: Both_off Ion1 Ion2 Both_on" END_OBJECT = COLUMN OBJECT = COLUMN NAME = "EVEN_ODD" DATA_TYPE = CHARACTER START_BYTE = 93 BYTES = 8 FORMAT = "N/A" UNIT = "N/A" UNIT = "N/A" UNIT = "N/A" END_OBJECT = COLUMN /* transmitted (64 for full resolution and 32 for low resolution) or even/odd energies alternatively. Takes the values: even odd or full" END_OBJECT = COLUMN /* transmitted counts */ /* Type column : measurement number */ /* Type = INTEGER START_BYTE = 103 BYTES = 5 FORMAT = "IS" UNIT = "N/A" DESCRIPTION = "Measurement index" END_OBJECT = COLUMN</pre>				
<pre>FORMAT = "N/A" UNIT = "N/A" UNIT = "Ion channel status: Both off Ion1 Ion2 Both on" END_OBJECT = COLUMN OBJECT = COLUMN NAME = "EVEN ODD" DATA TYPE = CHARACTER START BYTE = 93 BYTES = 8 FORMAT = "N/A" UNIT = "N/A" DESCRIPTION = "Indicates whether all energies are transmitted (64 for full resolution and 32 for low resolution) or even/odd energies alternatively. Takes the values: even odd or full" END_OBJECT = COLUMN /* transmitted (64 for full resolution and 32 for low resolution) or even/odd energies alternatively. Takes the values: even odd or full" END_OBJECT = COLUMN /* Type column : measurement number */ /* Type column : measurement number */ /* Type column : measurement type (IICNTA or I2CNTA) */ /* Type column : measurement type (IICNTA or I2CNTA) */ /* Type = INTESER START BYTE = 103 BYTES = 5 FORMAT = "IS" UNIT = "N/A" DESCRIPTION = "NA" DESCRIPTION = "Aesurement index" END_OBJECT = COLUMN</pre>	_			
UNIT = "N/A" DESCRIPTION = "Ion channel status: Both_off Ion1 Ion2 Both_on" END_OBJECT = COLUMN OBJECT = COLUMN NAME = "EVEN ODD" DATA TYPE = CHARACTER START BYTE = 93 BYTE5 = 8 FORMAT = "N/A" UNIT = "N/A" DESCRIPTION = "Indicates whether all energies are transmitted (64 for full resolution and 32 for low resolution) or even/odd energies alternatively. Takes the values: even_odd or full" END_OBJECT = COLUMN /* ***********************************				
DESCRIFTION = "Ton channel status: Both off IonI Ion2 Both on" END_OBJECT = COLUMN OBJECT = COLUMN NAME = "EVEN ODD" DATA_TYPE = CHARACTER START_BYTE = 93 BYTES = 8 FORMAT = "N/A" UNIT = "N/A" DESCRIFTION = "Indicates whether all energies alternatively. Takes the values: even odd or full resolution and 32 for low resolution) or even/odd energies alternatively. Takes the values: even odd or full" END_OBJECT = COLUMN /* ***********************************				
LOR2 Both_on" Both_on" END_OBJECT = COLUMN NAME = "EVEN_ODD" DATA_TYPE = CHARACTER START_BYTE = 93 BYTES = 8 FORMAT = "N/A" UNIT = "N/A" DESCRIPTION = "Indicates whether all energies alternatively. Takes the values: even_odd or full" END_OBJECT = COLUMN /* ***********************************		= "Ion channel status:		
<pre>END_OBJECT = COLUMN NAME = "EVEN_ODD" DATA TYPE = CHARACTER START_BYTE = 93 BTTES = 8 FORMAT = "N/A" UNIT = "N/A" DESCRIPTION = "Indicates whether all energies are transmitted (64 for full resolution and 32 for low resolution) or even/odd energies alternatively. Takes the values: even odd or full" END_OBJECT = COLUMN /* transmitted columns */ /* Type column : measurement number */ /* Type column : measurement type (ILCNTA or IZCNTA) */ /* Type column : measurement type (ILCNTA or IZCNTA) */ /* Type = INTEGER START_BYTE = 103 BTTES = 5 FORMAT = "IS" UNIT = "N/A" DESCRIPTION = "Measurement index" END_OBJECT = COLUMN OBJECT = COLUMN</pre>		Ion2		
<pre>NAME = "EVEN_ODD" DATA_TYPE = CHARACTER START_BYTE = 93 BYTES = 8 FORMAT = "N/A" UNIT = "N/A" DESCRIPTION = "Indicates whether all energies are transmitted (64 for full resolution and 32 for low resolution) or even/odd energies alternatively. Takes the values:</pre>	END_OBJECT			
DATA_TYPE = CHARACTER START_BYTE = 93 BYTES = 8 FORMAT = "N/A" UNIT = "N/A" DESCRIPTION = "Indicates whether all energies are transmitted (64 for full resolution and 32 for low resolution) or even/odd energies alternatively. Takes the values: even_odd or full" END_OBJECT = COLUMN /* ***********************************	OBJECT	= COLUMN		
<pre>START_BYTE = 93 BYTES = 8 FORMAT = "N/A" UNIT = "N/A" DESCRIPTION = "Indicates whether all energies are transmitted (64 for full resolution and 32 for low resolution) or even/odd energies alternatively. Takes the values:</pre>	NAME			
<pre>BYTES = 8 FORMAT = "N/A" UNIT = "N/A" DESCRIPTION = "Indicates whether all energies are transmitted (64 for full resolution and 32 for low resolution) or even/odd energies alternatively. Takes the values:</pre>				
<pre>FORMAT = "N/A" UNIT = "N/A" DESCRIPTION = "Indicates whether all energies are transmitted (64 for full resolution and 32 for low resolution) or even/odd energies alternatively. Takes the values:</pre>				
UNIT = "N/A" DESCRIPTION = "Indicates whether all energies are transmitted (64 for full resolution and 32 for low resolution) or even/odd energies alternatively. Takes the values: even_odd or full" END_OBJECT = COLUMN /* transmitter transmitter transmitter transmitter transmitter /* Add index and type columns */ /* Index column : measurement number */ /* Type column : measurement type (I1CNTA or I2CNTA) */ /* Type column : measurement type (I1CNTA or I2CNTA) */ /* transmitter transmitter transmitter OBJECT = COLUMN NAME = "INDEX" DATA TYPE = INTEGER START_BYTE = 103 BYTES = 5 FORMAT = "I5" UNIT = "N/A" DESCRIPTION = "Measurement index" END_OBJECT = COLUMN		0		
DESCRIPTION = "Indicates whether all energies are transmitted (64 for full resolution and 32 for low resolution) or even/odd energies alternatively. Takes the values: even_odd or full" END_OBJECT = COLUMN /* ***********************************				
<pre>are transmitted (64 for full resolution and 32 for low resolution) or even/odd energies alternatively. Takes the values: even odd or full" END_OBJECT = COLUMN /* ***********************************</pre>			lenergies	
32 for low resolution) or even/odd energies alternatively. Takes the values: even_odd or full" END_OBJECT = COLUMN /* ***********************************	DEDCRIFTION			and
<pre>alternatively. Takes the values: even_odd or full" END_OBJECT = COLUMN /* ***********************************</pre>				
<pre>END_OBJECT = COLUMN /* ***********************************</pre>			ne values:	
<pre>/* ***********************************</pre>	END OBJECT	—		
<pre>/* Add index and type columns</pre>	—		* * * * * * * * * * * * * * * * * * * *	* */
<pre>/* Index column : measurement number</pre>	,			
<pre>/* Type column : measurement type (I1CNTA or I2CNTA) */ /* ********************************</pre>				
OBJECT= COLUMNNAME= "INDEX"DATA_TYPE= INTEGERSTART_BYTE= 103BYTES= 5FORMAT= "I5"UNIT= "N/A"DESCRIPTION= "Measurement index"END_OBJECT= COLUMNOBJECT= COLUMN	/* Type colum	nn : measurement type (I1C)		
NAME = "INDEX" DATA_TYPE = INTEGER START_BYTE = 103 BYTES = 5 FORMAT = "I5" UNIT = "N/A" DESCRIPTION = "Measurement index" END_OBJECT = COLUMN OBJECT = COLUMN	/* **************	***********************	* * * * * * * * * * * * * * * * * * * *	* */
DATA_TYPE = INTEGER START_BYTE = 103 BYTES = 5 FORMAT = "I5" UNIT = "N/A" DESCRIPTION = "Measurement index" END_OBJECT = COLUMN OBJECT = COLUMN				
START_BYTE= 103BYTES= 5FORMAT= "I5"UNIT= "N/A"DESCRIPTION= "Measurement index"END_OBJECT= COLUMNOBJECT= COLUMN				
BYTES = 5 FORMAT = "I5" UNIT = "N/A" DESCRIPTION = "Measurement index" END_OBJECT = COLUMN OBJECT = COLUMN				
FORMAT= "15"UNIT= "N/A"DESCRIPTION= "Measurement index"END_OBJECT= COLUMNOBJECT= COLUMN				
UNIT = "N/A" DESCRIPTION = "Measurement index" END_OBJECT = COLUMN OBJECT = COLUMN				
DESCRIPTION = "Measurement index" END_OBJECT = COLUMN OBJECT = COLUMN				
END_OBJECT = COLUMN OBJECT = COLUMN				

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DATA TYPE	= CHARACTER		
START BYTE	= 110		
BYTES	= 6		
FORMAT	= "N/A"		
	= "N/A"		
DESCRIPTION	= "Measurement type (I1CN	NTA or I2CNTA)"	
END_OBJECT =	COLUMN		
/* ***********	* * * * * * * * * * * * * * * * * * * *	* * * * * * * * * * * * * * * * *	*/
OBJECT	= COLUMN		
	= "ANGLE_BIN"		
—	= INTEGER		
START_BYTE	= 118		
BYTES	= 2 = "I2"		
FORMAT UNIT	= "N/A"		
	= "Elevation step"		
END_OBJECT	= COLUMN		
OBJECT	= COLUMN		
NAME	= "COUNTS"		
DATA TYPE	= INTEGER		
START BYTE	= 121		
BYTES	= 8		
FORMAT	= "I8"		
UNIT	= "N/A"		
DESCRIPTION	= "Sum of counts for ener Or 0 to 63"	gy steps 0 to 31	
END_OBJECT	= COLUMN		
OBJECT	= COLUMN		
NAME	= "OVERFLOW FLAG"		
DATA_TYPE	= CHARACTER		
START_BYTE	= 131		
BYTES	= 64		
FORMAT UNIT	= "N/A" = "N/A"		
DESCRIPTION	= "String of 64 character	·· · · · · · · · · · · · · · · · · · ·	or corresponds
DESCRIPTION	to a step of energy an values :		
	0 : No overf	low	
	1 : Overflow		
	In low resolution the		rs are unused
	and set to blank "		
END_OBJECT	= COLUMN		
	1 6 10 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		
	definition (current-angle), parar		els 1 or 2)
OBJECT	= ROMAP_SPM_PAR_IC		
NAME	= ROMAP_SPM_PAR_IC	DN_CRA	
INTERCHANGE_FC ROWS	RMAT = ASCII = 96		
^STRUCTURE	= 90 = "Romap spm par i		

INTERCHANGE_FORMAT	= ASCII
ROWS	= 96
^STRUCTURE	= "ROMAP SPM PAR ION CRA.FMT"
COLUMNS	= 14
ROW BYTES	= 194
END_OBJECT	= ROMAP_SPM_PAR_ION_CRA_TABLE

The structure of the TABLE object is described in the file ROMAP_SPM_PAR_ION_CRA.FMT as follows:

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OBJECT	= COLUMN		
NAME	= "UTC"		
DATA_TYPE	= TIME		
START_BYTE	= 1		
BYTES	= 23	a the IMC	
DESCRIPTION	= "This column represents Of the SPM spectrum in YYYY-MM-DDThh:mm:ss.ss	n PDS standard fo	ormat
END_OBJECT	= COLUMN		
OBJECT	= COLUMN		
NAME	= "OBT"		
DATA_TYPE	= ASCII_REAL		
START_BYTE	= 25		
BYTES	= 15		
UNIT	= SECOND		
FORMAT	= "F15.5"		
DESCRIPTION	= "ROMAP 4 bytes counter a time synchronized with The time resolution is	Lander On Board	
END_OBJECT =	= COLUMN	0.03123 5	
OBJECT	= COLUMN		
NAME	= "MODE"		
DATA_TYPE	= CHARACTER		
START_BYTE	= 42		
BYTES	= 9		
FORMAT	= "N/A"		
UNIT	= "N/A"		
DESCRIPTION	= "SPM mode:		
END_OBJECT	raw or parameter" = COLUMN		
OBJECT	= COLUMN		
NAME	= "EXPOSITION TIME"		
DATA TYPE	= CHARACTER		
START BYTE	= 54		
BYTES	= 5		
FORMAT	= "N/A"		
UNIT	= "N/A"		
	= "SPM exposition time set	tting:	
	short or long"	-	
END_OBJECT	= COLUMN		
OBJECT	= COLUMN		
NAME	= "CALIBRATION"		
DATA_TYPE			
START_BYTE	= 62		
	= 8		
FORMAT	= "N/A"		
UNIT	= "N/A"		
DESCRIPTION		:	
END_OBJECT	active or inactive" = COLUMN		
OBJECT	= COLUMN		
OBJECT NAME DATA_TYPE START_BYTE	= "CEM SUPPLY"		
DATA TYPE	= ASCII INTEGER		
START BYTE	= 72		
BYTES	= 1		
	= "I1"		
UNIT	= "N/A"		
DESCRIPTION		:	
	step number from 1 to 5	5	

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OBJECT	= COLUMN		
NAME	= "RESOLUTION"		
DATA_TYPE	= CHARACTER = 75		
START_BYTE BYTES	= 75 = 4		
FORMAT	= "N/A"		
UNIT	= "N/A"		
DESCRIPTION	= "SPM resolution setti	ng:	
END OBJECT	low or high" = COLUMN		
- OBJECT	= COLUMN		
NAME	= "ION CHANNEL"		
DATA_TYPE	= CHARACTER		
START_BYTE	= 82		
BYTES	= 8		
FORMAT UNIT	= "N/A" $= "N/A"$		
DESCRIPTION	= "Ion channel status:		
51001111101	Both off		
	Ion1		
	Ion2		
END OD TECH	Both_on" = COLUMN		
END_OBJECT	- COLOMN		
OBJECT	= COLUMN		
NAME	= "EVEN_ODD" = CHARACTER		
DATA_TYPE START BYTE	= CHARACTER = 93		
BYTES	= 8		
FORMAT	= "N/A"		
UNIT	= "N/A"		
DESCRIPTION	= "Indicates whether al		
	are transmitted (64 fo 32 for low resolution)		
	alternatively. Takes t		162
	even odd or full"		
END_OBJECT	= COLUMN		
/* **********	* * * * * * * * * * * * * * * * * * * *	* * * * * * * * * * * * * * * * * *	* */
/* Add index and			*/
/* Index cc	olumn : measurement number		*/
	<pre>olumn : measurement type (I1C ************************************</pre>		*/
1			/
OBJECT	= COLUMN		
NAME	= "INDEX"		
DATA_TYPE START BYTE			
BYTES	= 103		
FORMAT UNIT	= "15"		
UNIT	= "N/A"		
	= "Measurement index"		
DESCRIPTION	- COLUMN		
DESCRIPTION END_OBJECT OBJECT	= COLUMN		
DESCRIPTION END_OBJECT OBJECT NAME	= COLUMN = "TYPE"		
DESCRIPTION END_OBJECT OBJECT NAME DATA_TYPE	= COLUMN = "TYPE" = CHARACTER		
DESCRIPTION END_OBJECT OBJECT NAME DATA_TYPE START_BYTE	= COLUMN = "TYPE" = CHARACTER = 110		
DESCRIPTION END_OBJECT OBJECT NAME DATA_TYPE START_BYTE BYTES	= COLUMN = "TYPE" = CHARACTER		
DESCRIPTION END_OBJECT OBJECT NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT	= COLUMN = "TYPE" = CHARACTER = 110 = 6 = "N/A" = "N/A"		
DESCRIPTION END_OBJECT OBJECT NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	= COLUMN = "TYPE" = CHARACTER = 110 = 6 = "N/A"	CRTA or I2CRTA)"	

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NAME	<pre>= COLUMN = "ANGLE_BIN" = INTEGER = 118 = 2 = "I2" = "N/A"</pre>		
DESCRIPTION END_OBJECT	<pre>= "Elevation step number" = COLUMN</pre>		
DATA_TYPE START_BYTE BYTES FORMAT	<pre>= COLUMN = "CURRENT" = INTEGER = 121 = 6 = "I6" = "I6" = "N/A" = "Sum of currents for ene Or 0 to 63"</pre>	ergy steps 0 to 3	31
END_OBJECT	= COLUMN		
OBJECT NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	<pre>= COLUMN = "OVERFLOW FLAG" = CHARACTER = 129 = 64 = "N/A" = "N/A" = "String of 64 characterss to a step of energy and values :</pre>	l may take one of .ow	the following
END_OBJECT	= COLUMN		

4.3.2.4.7 Faraday cup current-energy distribution

FC TABLE object for PAR mode

= ROMAP SPM PAR FC TABLE
= $ROMAP$ SPM PAR FC
= ASCII
= 54
= 12
= 119
= "ROMAP_SPM_FC.FMT"
= ROMAP_SPM_PAR_FC_TABLE

FC TABLE object for RAW mode

OBJECT	= ROMAP_SPM_RAW_FC_TABLE
NAME	= ROMAP_SPM_RAW_FC
INTERCHANGE_FORMAT	= ASCII
ROWS	= 272
COLUMNS	= 12
ROW_BYTES	= 119
^STRUCTURE	= "ROMAP_SPM_FC.FMT"
END_OBJECT	= ROMAP_SPM_RAW_FC_TABLE

The structure of the TABLE object is described in the file ROMAP_SPM_FC.FMT as follows:

GEP Braunschweig	ROMAP EAICD	Document No. Issue/Rev. No. Date Page	RO-ROL-ROMAP-EAICD 1 / 1 14-July-2016 63
	tents of format file "ROMAH urrent-energy distribution		*/ */
/* Include the HEAD	**************************************	measurement	*/
OBJECT	= COLUMN		
NAME	= "UTC"		
DATA_TYPE START BYTE	= TIME = 1		
BYTES	= 23		
DESCRIPTION	"This column represents Of the SPM spectrum in YYYY-MM-DDThh:mm:ss.ss	n PDS standard f	ormat
END_OBJECT	= COLUMN		
OBJECT	= COLUMN		
NAME	= "OBT"		
DATA_TYPE START BYTE	= ASCII_REAL = 25		
BYTES	= 15		
UNIT	= SECOND		
FORMAT	= "F15.5"		
DESCRIPTION	<pre>= "ROMAP 4 bytes counter r time synchronized with The time resolution is</pre>	Lander On Board	
END_OBJECT	= COLUMN		
OBJECT	= COLUMN		
NAME	= "MODE"		
DATA_TYPE START BYTE	= CHARACTER $= 42$		
BYTES	= 9		
FORMAT	= "N/A"		
UNIT	= "N/A"		
DESCRIPTION	<pre>= "SPM mode: raw or parameter"</pre>		
END_OBJECT	= COLUMN		
OBJECT	= COLUMN		
NAME DATA TYPE	= "EXPOSITION_TIME"		
DATA_TYPE START BYTE	= CHARACTER = 54		
START_BYTE BYTES	= 5		
FORMAT	= "N/A"		
UNIT	= "N/A"		
DESCRIPTION	<pre>= "SPM exposition time set short or long"</pre>	tting:	
END_OBJECT	= COLUMN		
OBJECT	= COLUMN		
NAME	= "CALIBRATION"		
DATA_TYPE START_BYTE	= CHARACTER		
BYTES	- 62 = 8		
	= "N/A" = "N/A"		
DESCRIPTION	<pre>= "SPM calibration status:</pre>	:	
END_OBJECT			
OBJECT	= COLUMN		
NAME	= "CEM_SUPPLY" = ASCII_INTEGER		
DATA_TYPE START_BYTE	= ASCII_INTEGER = 72		
DIVUT DITE	12		

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BYTES	= 1		
FORMAT	= "I1"		
UNIT	= "N/A"		
DESCRIPTION	= "SPM CEM supply setting:		
END_OBJECT	step number from 1 to 5 = COLUMN		
OBJECT	= COLUMN		
NAME	= "RESOLUTION"		
DATA_TYPE	= CHARACTER		
START_BYTE	= 75		
BYTES FORMAT	= 4 = "N/A"		
UNIT	= $N/A=$ N/A "		
DESCRIPTION	= "SPM resolution setting:	:	
	low or high"		
END_OBJECT	= COLUMN		
OBJECT	= COLUMN		
NAME	= "ION_CHANNEL"		
DATA_TYPE	= CHARACTER		
START_BYTE	= 82		
BYTES			
FORMAT UNIT	= "N/A" = "N/A"		
DESCRIPTION	= "Ion channel status:		
22001111011	Both_off Ion1		
	Ion2		
END_OBJECT	Both_on" = COLUMN		
OBJECT			
NAME	= COLUMN = "EVEN ODD"		
DATA TYPE	= CHARACTER		
START BYTE	= 93		
BYTES	= 8		
FORMAT	= "N/A"		
UNIT	= "N/A"		
DESCRIPTION	<pre>= "Indicates whether all e are transmitted (64 for f 32 for low resolution) or alternatively. Takes the</pre>	full resolution r even/odd energ	
	even_odd or full"		
END_OBJECT	= COLUMN		
	******	* * * * * * * * * * * * * * * * * * * *	
/* Add index column /* Index column	: measurement number		*/ */
	**************************************	* * * * * * * * * * * * * * * * *	
	COLUMN		
NAME	= "INDEX"		
—	= INTEGER = 103		
BYTES	= 103 = 5		
	= "I5"		
	= "N/A"		
	= "Measurement index"		
—	: COLUMN		
/* ***************	* * * * * * * * * * * * * * * * * * * *	* * * * * * * * * * * * * * *	*/
OBJECT	= COLUMN		
NAME	= "ENERGY_BIN"		
DATA_TYPE START BYTE	= INTEGER		
	= 109		

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BYTES FORMAT UNIT DESCRIPTION END_OBJECT	= 2 = "I2" = "N/A" = "Energy bin number" = COLUMN		
OBJECT NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION END_OBJECT	<pre>= COLUMN = "CURRENT" = INTEGER = 112 = 6 = "I6" = "ADC_UNITS" = "Faraday cup Current " = COLUMN</pre>		

4.3.2.4.8 Electron spectrum (count-energy distribution)

Electron spectrum TABLE object for PAR mode.

OBJECT	= ROMAP SPM PAR ELEC TABLE
NAME	= ROMAP SPM PAR ELEC
INTERCHANGE FORMAT	= ASCII
ROWS	= 96
COLUMNS	= 12
ROW BYTES	= 119
^STRUCTURE	= "ROMAP SPM ELEC.FMT"
END_OBJECT	= ROMAP_SPM_PAR_ELEC_TABLE

Electron spectrum TABLE object for RAW mode.

OBJECT	= ROMAP_SPM_RAW_ELEC_TABLE
NAME	= ROMAP SPM RAW ELEC
INTERCHANGE_FORMAT	= ASCII
ROWS	= 256
COLUMNS	= 12
ROW BYTES	= 119
^STRUCTURE	= "ROMAP SPM ELEC.FMT"
END_OBJECT	= ROMAP_SPM_RAW_ELEC_TABLE

The structure of the TABLE object is described in the file ROMAP_SPM_ELEC.FMT as follows:

```
/*
             Contents of format file "ROMAP SPM ELEC.FMT"
                                                              */
*/
.
/ *
        Electron spectrum (count-energy distribution) (Level 2)
/* Include the HEADER at the beginning of each measurement
                                                      */
OBJECT
                  = COLUMN
  = "UTC

= "UTC

START_BYTE = 1

BYTES = 23

DESCRIPTION = "Thick
                = "UTC"
                = "This column represents the UTC
                   Of the SPM spectrum in PDS standard format
                    YYYY-MM-DDThh:mm:ss.sss"
END OBJECT
                 = COLUMN
OBJECT
                 = COLUMN
                 = "OBT"
   NAME
   DATA TYPE
                = ASCII REAL
   START_BYTE
                = 25
   BYTES
                 = 15
                = SECOND
   UNIT
   FORMAT
   FORMAT = "F15.5"
DESCRIPTION = "ROMAP 4 bytes counter representing the measurement
```



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time synchronized with Lander On Board Time. The time resolution is 0.03125 s" END OBJECT = COLUMN OBJECT = COLUMN = "MODE" NAME = CHARACTER DATA TYPE START_BYTE = 42 = 9 BYTES FORMAT = "N/A" = "N/A" UNIT = "SPM mode: DESCRIPTION raw or parameter" END OBJECT = COLUMN OBJECT = COLUMN NAME = "EXPOSITION_TIME" = CHARACTER DATA_TYPE = 54 START_BYTE BYTES = 5 = "N/A" FORMAT = "N/A" UNIT = "SPM exposition time setting: DESCRIPTION short or long" END OBJECT = COLUMN OBJECT = COLUMN = "CALIBRATION" NAME DATA_TYPE START_BYTE = CHARACTER = 62 BYTES = 8 FORMAT = "N/A" = "N/A" UNIT = "SPM calibration status: DESCRIPTION active or inactive" END OBJECT = COLUMN OBJECT = COLUMN = "CEM SUPPLY" NAME DATA TYPE = ASCII INTEGER START BYTE = 72 = 1 = "I1" BYTES FORMAT = "N/A" UNIT = "SPM CEM supply setting: DESCRIPTION step number from 1 to 5" END OBJECT = COLUMN OBJECT = COLUMN = "RESOLUTION" NAME DATA TYPE = CHARACTER = 75 START_BYTE BYTES = 4 = "N/A" FORMAT = "N/A" UNIT = "SPM resolution setting: DESCRIPTION low or high" END OBJECT = COLUMN OBJECT = COLUMN = "ION CHANNEL" NAME = CHARACTER DATA TYPE START_BYTE = 82 = 8 BYTES FORMAT = "N/A" = "N/A" UNTT = "Ion channel status: DESCRIPTION

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END_OBJECT	Both_off Ion1 Ion2 Both_on" = COLUMN		
OBJECT NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	<pre>= COLUMN = "EVEN_ODD" = CHARACTER = 93 = 8 = "N/A" = "N/A" = "Indicates whether all are transmitted (64 for 32 for low resolution) o alternatively. Takes the even odd or full"</pre>	full resolution a r even/odd energi	
END_OBJECT	= COLUMN		
/* Add index column /* Index column	**************************************		*/ */
NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	<pre>= COLUMN = "INDEX" = INTEGER = 103 = 5 = "I5" = "N/A" = "Measurement index" = COLUMN</pre>		
—	****	* * * * * * * * * * * * * * *	* /
OBJECT NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION END_OBJECT	<pre>= COLUMN = "ENERGY_BIN" = INTEGER = 109 = 2 = "I2" = "N/A" = "Energy bin number" = COLUMN</pre>		
START_BYTE BYTES FORMAT	<pre>= COLUMN = "COUNTS" = INTEGER = 112 = 6 = "I6" = "ADC_UNITS" = "Electron counts" = COLUMN</pre>		

4.3.2.5 Description of Instrument

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



4.3.3 Housekeeping Edited Data Product Design (Level 2)

4.3.3.1 File Characteristics Data Elements

The PDS file characteristic data elements for ROMAP HK edited data (level 2) are:

RECORD_TYPE = FIXED_LENGTH RECORD_BYTES FILE_RECORDS LABEL_RECORDS

4.3.3.2 Data Object Pointers Identification Data Elements

The ROMAP HK edited data are organized as ASCII tables. The data object pointers (^TABLE) reference TAB files.

4.3.3.3 Instrument and Detector Descriptive Data Elements

= "ROSETTA-LANDER"
= RL
= ROMAP
= "ROSETTA LANDER MAGNETOMETER AND PLASMA MONITOR"
<pre>= { "FLUXGATE MAGNETOMETER", "ELECTROSTATIC ANALYZER",</pre>
"FARADAY CUP"}
= "N/A"
= "N/A"

4.3.3.4 Data Object Definition

Each TAB file contains a 16 columns table with the uncalibrated HK data (ADC units).

OBJECT	=	TABLE
NAME	=	"ROMAP_RAWHK_TABLE"
INTERCHANGE_FORMAT	=	ASCII
ROWS	=	
COLUMNS	=	8
ROW BYTES	=	153
^STRUCTURE	=	"ROMAP RAWHK.FMT"
END_OBJECT	=	TABLE

The structure of the TABLE object is described in the file ROMAP_RAWHK.FMT as follows:

/* Contents of	format file "ROMAP_RAWHK.FMT" (Uncalibrated HK data) */		
OBJECT NAME DATA_TYPE START_BYTE BYTES DESCRIPTION	<pre>= COLUMN = "UTC" = TIME = 1 = 23 = "This column represents the UTC Of the HK parameters set in PDS standard format YYYY-MM-DDThh:mm:ss.sss"</pre>		
END_OBJECT	= COLUMN		
	<pre>= COLUMN = "OBT" = ASCII_REAL = 25 = 15 = SECOND = "F15.5" = "ROMAP 4 bytes counter representing the measurement time synchronized with Lander On Board Time. The time resolution is 0.03125 s"</pre>		
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---	---	--	--
END_OBJECT	= COLUMN		
OBJECT NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	<pre>= COLUMN = "CONTROLLER STATUS" = CHARACTER = 42 = 4 = "N/A" = "N/A" = " Controller Status E</pre>	Bits in Hexadecimal	Format :
	Bit	Description	
	1 Status flag : 3 Error flag : 1	Instrument Mode was at power-up from TG MAG setting was loa TC-Buffer read TC-Buffer error write BRAM error; ci	C-Buffer aded from r at power-up leared after
	6 Error flag : S	successfully writin CC-Buffer content e: (illegal checksum) SPM Ion 1 counter or (cleared after disp)	rror verflow occurred
	7 Error flag : S	overflow error flag SPM Ion 2 counter ov (cleared after disp. overflow errorflag	g in HK data) verflow occurred laying SPM
		SPM Electron counte occurred (cleared as SPM overflow error s Penning pressure se	r overflow fter displaying flag in HK data)
	10Status flag:11Status flag:1213Not used	Pirani pressure set DUMMY FPGA output of IO, I1 identify in:	nsor on/off on/off
END_OBJECT	If one of the bits (until the instrument = COLUMN		it stays active
FORMAT UNIT DESCRIPTION END OBJECT	<pre>= COLUMN = "LAST RECEIVED TC (WC = CHARACTER = 49 = 4 = "N/A" = "N/A" = "Last received TC (wc = COLUMN</pre>	ord 1) in Hexadecima	al Format"
FORMAT UNIT DESCRIPTION	<pre>= COLUMN = "LAST RECEIVED TC (WC = CHARACTER = 56 = 4 = "N/A" = "N/A" = "Last received TC (wc = COLUMN</pre>		al Format"
BITES	<pre>= COLUMN = "POWER CONSUMPTION" = ASCII_INTEGER = 62 = 6 = "I6"</pre>		

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UNIT	= "ADC_COUNTS"		
DESCRIPTION	= "Overall instrument P = N * 76.3E-3 *		
END_OBJECT	= COLUMN	- <u>+</u> [10144]	
OBJECT	= COLUMN		
NAME	= COLUMN = "+5V CURRENT"		
DATA_TYPE START BYTE	= ASCII_INTEGER		
BYTES	= 6		
	= "I6" - "ADC COUNTC"		
UNIT DESCRIPTION	= "ADC_COUNTS" = "+5V current		
DESCRIPTION	I = N * 76.3E-3 *	0 5 [mA]"	
END_OBJECT	= COLUMN	0.0 [nul]	
OBJECT	= COLUMN		
NAME	= "-5V CURRENT"		
DATA_TYPE	= ASCII_INTEGER = 76		
_			
BYTES	= 6		
FORMAT UNIT	= "I6" = "ADC COUNTS"		
DESCRIPTION	= "-5V current		
	I = N * 76.3E-3 *	0.05 [mA]"	
END_OBJECT	= COLUMN		
OBJECT	= COLUMN		
NAME	= COLUMN = "ELECTRONICS TEMPER = ASCII INTEGER	ATURE"	
	= ASCII_INTEGER		
START_BYTE	= 83		
BYTES	= 6		
FORMAT	= "16"		
UNIT	= "ADC_COUNTS"		
DESCRIPTION	= "electronics temper T = (N + 76 3E - 6 - 6)	· 0.535) * 472.9 [°C]	
END_OBJECT	= COLUMN	0.000) 1/2.9 [0]	
OBJECT	= COLUMN		
DATA TYPE	= ASCII INTEGER		
START_BYTE	= 90		
BYTES	= 6		
FORMAT	= "16"		
UNIT'	= "ADC_COUNTS"		
NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	I = N * 76.3E-3 *	0 025 [m]]"	
END OD TECH			
OBJECT	<pre>= COLUMN = "SPM HV STATUS 1" = CHARACTER = 98 = 4 = "N/A" = "N/A" = "SPM HV status 1 in = COLUMN</pre>		
NAME	= "SPM HV STATUS 1"		
DATA_TYPE	= CHARACTER		
START_BYTE	= 98		
BYTES	=4		
FORMA'I'	= "N/A"		
	- N/A = "SPM HV status 1 in	Hevadecimal Format"	
END_OBJECT	= COLUMN	i nexadecimai roimat	
OBJECT	= COLUMN		
NAME	<pre>= COLUMN = "SPM HV STATUS 2" = CHARACTER = 105 = 4</pre>		
DATA_TYPE	= CHARACTER		
START_BYTE	= 105		
BYTES	= 4		
FORMAT UNIT	= "N/A" = "N/A"		
UNII	- IN / PA		

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END_OBJECT	= COLUMN		
START_BYTE BYTES FORMAT UNIT	<pre>= COLUMN = "SPM HV STATUS 3" = CHARACTER = 112 = 4 = "N/A" = "N/A" = "SPM HV status 3 in 3 = COLUMN</pre>	Hexadecimal Format"	
START_BYTE BYTES FORMAT UNIT	<pre>= COLUMN = "SPM HV STATUS 4" = CHARACTER = 119 = 4 = "N/A" = "N/A" = "SPM HV status 4 in 4 = COLUMN</pre>	Hexadecimal Format"	
OBJECT NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION END_OBJECT	= 125 = 6 = "I6" = "ADC COUNTS"		
OBJECT NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION END_OBJECT	<pre>= COLUMN = "PIRANI PRESSURE" = ASCII_INTEGER = 132 = 6 = "I6" = "ADC_COUNTS" = "Pirani pressure" = COLUMN</pre>		
OBJECT NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	<pre>= COLUMN = "PROM CHECKSUM" = CHARACTER = 140 = 4 = "N/A" = "N/A" = "PROM checksum (comp in Hexadecimal Form = COLUMN</pre>	uted at power-up) at"	
- OBJECT DATA_TYPE START_BYTE BYTES FORMAT	<pre>= COLUMN = "INSTRUMENT ERROR FL. = CHARACTER</pre>		Format :
		ription low (a TC was receiv former was proc	

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END_OBJECT	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 = COLUMN	CDMS illegal word CDMS message error General CDMS rece General CDMS rece Wrong telecommand CDMS request over befo Frame buffer over MAG vector samplin CDMS error code wo CDMS checksum error checksum error in SPM counter over SPM transmission SPM setup error"	r iving error smission error received flow (a CDMS req re the former wa flow ng overflow ord received or received CDMS S low flow	s processed)

4.3.3.5 Description of Instrument

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

4.3.4 Magnetometer Science calibrated Data Product Design (Level 3)

There are two kinds of calibrated science data for the ROMAP MAG instrument, draft calibrated and final calibrated. The draft calibration refers to that data are in physical units (like nanoTesla), scaled, rotated into different coordinates and preliminary offsets subtracted. The different frames are Magnetometer, Lander, Orbiter and Ecliptic J2000. Level 3 contains draft calibrated MAG data.

4.3.4.1 File Characteristics Data Elements

The PDS file characteristic data elements for ROMAP MAG science calibrated data are:

```
RECORD_TYPE = FIXED_LENGTH
RECORD_BYTES = 119
FILE_RECORDS
LABEL_RECORDS
```

4.3.4.2 Data Object Pointers Identification Data Elements

The ROMAP MAG SC calibrated data are organized as ASCII tables. The data object pointers (^TABLE) reference TAB files.

4.3.4.3 Instrument and Detector Descriptive Data Elements

The following data identification elements provide additional information about the ROMAP-MAG data products.



4.3.4.4 Data Object Definition

4.3.4.4.1 Level A data object definition (draft calibrated in instrument coordinates)

Each TAB file contains an eight columns table with the magnetic field and the spacecraft position.

TABLE
"ROMAP_MAG_CALSCA_TABLE"
ASCII
8
119
"ROMAP MAG CALSCA.FMT"
TABLE

The structure of the TABLE object is described in the file ROMAP_MAG_CALSCA.FMT as follows:

```
/*
                Contents of format file "ROMAP_MAG_CALSCA.FMT"
                                                                             */
/*
      Level A data object definition :
                                                                             */
.
/*
                                                                             */
     draft calibrated in instrument coordinates
OBJECT
                      = COLUMN
                      = "UTC"
    NAME
    DATA TYPE
                      = TIME
    START_BYTE
                      = 1
                      = 23
    BYTES
    DESCRIPTION
                      = "This column represents the UTC
                         Of the magnetic field vector in PDS standard format
                          YYYY-MM-DDThh:mm:ss.sss"
END OBJECT
                      = COLUMN
OBJECT
                     = COLUMN
                     = "OBT"
    NAME
    DATA TYPE
                     = ASCII REAL
    START_BYTE
                     = 25
    BYTES
                     = 15
    UNIT
                     = SECOND
                     = "F15.5"
    FORMAT
    DESCRIPTION
                     = "ROMAP 4 bytes counter representing the measurement
                        time synchronized with Lander On Board Time.
                        The time resolution is 0.03125 s"
END OBJECT
                     = COLUMN
OBJECT
                     = COLUMN
                     = "POS_X"
    NAME
    DATA_TYPE
START_BYTE
                     = ASCII REAL
                     = 41
    BYTES
                     = 16
                     = "F16.3"
    FORMAT
                     = KILOMETER
    UNIT
    DESCRIPTION
                     = "X component of the Spacecraft (Lander) position,
                        ECLIPJ2000 coordinates"
END OBJECT
                     = COLUMN
OBJECT
                     = COLUMN
                     = "POS_Y"
= ASCII_REAL
    NAME
    DATA TYPE
    START BYTE
                     = 58
    BYTES
                     = 16
                     = "F16.3"
    FORMAT
                     = KILOMETER
    UNIT
                    = "Y component of the Spacecraft (Lander) position,
    DESCRIPTION
                        ECLIPJ2000 coordinates"
END OBJECT
                     = COLUMN
```

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01	BJECT	= COLUMN		
	NAME	= "POS_Z"		
	DATA_TYPE	= ASCII_REAL		
	START_BYTE	= 75		
	BYTES	= 16		
	FORMAT	= "F16.3"		
	UNIT	= KILOMETER		
	DESCRIPTION	= "Z component of the Spa ECLIPJ2000 coordinates		position,
El	ND_OBJECT	= COLUMN		
01	BJECT	= COLUMN		
	NAME	= "BX"		
	DATA TYPE	= ASCII_REAL		
	START_BYTE	= 92		
	BYTES	= 8		
	FORMAT	= "F8.2"		
	UNIT	= NANOTESLA		
	DESCRIPTION	= "Magnetic field X compo draft calibrated, inst		es"
El	ND_OBJECT	= COLUMN		
01	BJECT	= COLUMN		
	NAME	= "BY"		
	DATA TYPE	= ASCII REAL		
	START_BYTE	= 101		
	BYTES	= 8		
	FORMAT	= "F8.2"		
	UNIT	= NANOTESLA		
	DESCRIPTION	<pre>= "Magnetic field Y compo draft calibrated, instr</pre>		5"
El	ND_OBJECT	= COLUMN		
01	BJECT	= COLUMN		
	NAME	= "BZ"		
	DATA_TYPE	= ASCII_REAL		
	START_BYTE	= 110		
	BYTES	= 8		
	FORMAT	= "F8.2"		
	UNIT	= NANOTESLA		
	DESCRIPTION	= "Magnetic field Z compo		- "
El	ND OBJECT	<pre>draft calibrated, instr = COLUMN</pre>	ument coordinates	3
	—			

4.3.4.4.2 Level B data object definition (draft calibrated in Lander coordinates)

Each TAB file contains an eight columns table with the magnetic field and the spacecraft position.

OBJECT	= TABLE	
NAME	= "ROMAP MAG CALSCB TABLE"	
INTERCHANGE FORMAT	= ASCII	
ROWS	=	
COLUMNS	= 8	
ROW BYTES	= 119	
^STRUCTURE	= "ROMAP MAG CALSCB.FMT"	
END_OBJECT	= TABLE	

The structure of the TABLE object is described in the file ROMAP_MAG_CALSCB.FMT as follows:

/*	Contents of format file "ROMAP MAG CALSCB.FMT"	*/
/*	Level B data object definition :	*/
/*	draft calibrated in Lander coordinates	*/

OBJECT	=	COLUMN
NAME	=	"UTC"

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DATA_TYPE	= TIME		
START_BYTE	= 1		
BYTES	= 23	the UTC	
DESCRIPTION	= "This column represents Of the magnetic field YYYY-MM-DDThh:mm:ss.ss	vector in PDS s	tandard format
END_OBJECT	= COLUMN		
OBJECT	= COLUMN		
NAME	= "OBT"		
DATA TYPE	= ASCII_REAL		
START_BYTE BYTES	= 25 = 15		
UNIT	= IJ = SECOND		
FORMAT	= "F15.5"		
DESCRIPTION	= "ROMAP 4 bytes counter r time synchronized with The time resolution is	Lander On Board	measurement Time.
END_OBJECT	= COLUMN		
OBJECT	= COLUMN		
NAME	= "POS_X"		
DATA_TYPE	= ASCII_REAL		
START_BYTE	= 41		
BYTES	= 16		
FORMAT UNIT	= "F16.3" = KILOMETER		
DESCRIPTION	<pre>= "X component of the Space ECLIPJ2000 coordinates"</pre>	cecraft (Lander)	position,
END_OBJECT	= COLUMN		
OBJECT	= COLUMN		
NAME	= "POS Y"		
DATA_TYPE	= ASCII_REAL		
START_BYTE	= 58		
BYTES	= 16		
FORMAT	= "F16.3"		
UNIT	= KILOMETER	(Tenden)	waai ti aw
DESCRIPTION END OBJECT	<pre>= "Y component of the Spac ECLIPJ2000 coordinates" = COLUMN</pre>		position,
—			
OBJECT	= COLUMN = "POS Z"		
NAME DATA_TYPE	= "POS_Z"		
DATA TYPE	- ASCII_KEAL - 75		
START_BYTE BYTES	= 75 = 16		
FORMAT	= "F16.3"		
FORMAT UNIT	= KILOMETER		
DESCRIPTION	= "Z component of the Space ECLIPJ2000 coordinates"		position,
END_OBJECT	= COLUMN		
	= COLUMN		
NAME	= "BX"		
DATA_TYPE	= ASCII_REAL		
START_BYTE	= 92		
DATA_TYPE START_BYTE BYTES FORMAT	= 8		
FORMAT UNIT	- NANOTESIA		
	<pre>= NANOTESLA = "Magnetic field X compor draft calibrated, Lande</pre>	ent, en coordinates"	
END_OBJECT		L COOLUINALES	
OBJECT	= COLUMN		
	= "BY"		
DATA TYPE	= ASCII_REAL		

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START BYTE	= 101		
BYTES	= 8		
FORMAT	= "F8.2"		
UNIT	= NANOTESLA		
DESCRIPTION	= "Magnetic field Y compon	ent,	
	draft calibrated, Lander	coordinates"	
END_OBJECT	= COLUMN		
OBJECT NAME	= COLUMN = "BZ"		
DATA_TYPE START BYTE	= ASCII_REAL = 110		
BYTES	= 8		
FORMAT	- o = "F8.2"		
UNIT	= NANOTESLA		
DESCRIPTION	= "Magnetic field Z compon	ent	
	draft calibrated, Lander		
END OBJECT	= COLUMN		
_			

4.3.4.4.3 Level C data object definition (draft calibrated in Orbiter coordinates)

Each TAB file contains an eight columns table with the magnetic field and the spacecraft position.

OBJECT	=	TABLE
NAME	=	"ROMAP_MAG_CALSCC_TABLE"
INTERCHANGE_FORMAT	=	ASCII
ROWS	=	
COLUMNS	=	8
ROW BYTES	=	119
^STRUCTURE	=	"ROMAP_MAG_CALSCC.FMT"
END_OBJECT	=	TABLE

The structure of the TABLE object is described in the file ROMAP_MAG_CALSCC.FMT as follows:

```
/*
                Contents of format file "ROMAP MAG CALSCC.FMT"
                                                                            */
/*
                                                                            */
      /*
      draft calibrated in Orbiter coordinates
                                                                            */
                      = COLUMN
OBJECT
                 = 1.
= 1
= 23
= "T
                      = "UTC"
    NAME
    DATA_TYPE
                      = TIME
    START BYTE
    BYTES
   DESCRIPTION
                      = "This column represents the UTC
                         Of the magnetic field vector in PDS standard format
                         YYYY-MM-DDThh:mm:ss.sss"
END OBJECT
                     = COLUMN
OBJECT
                    = COLUMN
    NAME
                    = "OBT"
                    = ASCII_REAL
    DATA TYPE
    START BYTE
                     = 25
                    = 15
    BYTES
    UNIT
                    = SECOND
    UNIT

FORMAT = "F15.5"

DESCRIPTION = "ROMAP 4 bytes counter representing the measurement

time synchronized with Lander On Board Time.
                        The time resolution is 0.03125 s"
END OBJECT
                    = COLUMN
OBJECT
                     = COLUMN
                     = "POS X"
    NAME
    DATA_TYPE
               = ASCII_REAL
= 41
    START BYTE
    BYTES
                     = 16
                     = "F16.3"
    FORMAT
```

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UNIT	= KILOMETER		
DESCRIPTION	= "X component of the Spa ECLIPJ2000 coordinates		position,
END_OBJECT	= COLUMN		
OBJECT	= COLUMN		
NAME	= "POS_Y"		
DATA_TYPE	= ASCII_REAL		
START_BYTE	= 58		
BYTES	= 16		
FORMAT	= "F16.3"		
UNIT DESCRIPTION	= KILOMETER	accorate (Iandor)	position
DESCRIPTION	= "Y component of the Spa ECLIPJ2000 coordinates		posición,
END_OBJECT	= COLUMN		
OBJECT	= COLUMN		
NAME	= "POS Z"		
DATA TYPE	= ASCII REAL		
START_BYTE	= 75		
BYTES	= 16		
FORMAT	= "F16.3"		
UNIT	= KILOMETER		
DESCRIPTION	= "Z component of the Spa ECLIPJ2000 coordinates		position,
END_OBJECT	= COLUMN		
OBJECT	= COLUMN		
NAME	= "BX"		
DATA_TYPE	= ASCII_REAL		
START_BYTE	= 92		
BYTES	= 8		
FORMAT UNIT	= "F8.2" = NANOTESLA		
DESCRIPTION	= "Magnetic field X compo	nent	
DESCRETTION	draft calibrated, Orbi		
END_OBJECT	= COLUMN		
OBJECT	= COLUMN		
NAME	= "BY"		
DATA_TYPE	= ASCII_REAL		
START_BYTE	= 101		
BYTES	= 8		
FORMAT	= "F8.2"		
UNIT	= NANOTESLA		
DESCRIPTION	= "Magnetic field Y compo		
END_OBJECT	<pre>draft calibrated, Orbit = COLUMN</pre>	ler coordinates	
OBJECT	= COLUMN		
NAME	= "BZ"		
DATA TYPE	= ASCII REAL		
START BYTE	= 110		
BYTES	= 8		
FORMAT	= "F8.2"		
UNIT	= NANOTESLA		
DESCRIPTION	= "Magnetic field Z compo		
	draft calibrated, Orbit	ter coordinates"	
END OBJECT	= COLUMN		

4.3.4.4.4 Level D data object definition (draft calibrated in ECLIP J2000 coordinates) Each TAB file contains an eight columns table with the magnetic field and the spacecraft position.

OBJECT = TABLE NAME = "ROMAP_MAG_CALSCD_TABLE" INTERCHANGE_FORMAT = ASCII



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ROWS	=
COLUMNS	= 8
ROW BYTES	= 119
^STRUCTURE	= "ROMAP MAG CALSCD.FMT"
END_OBJECT	= TABLE

The structure of the TABLE object is described in the file ROMAP_MAG_CALSCD.FMT as follows:

/* Level D data ob	<pre>nts of format file "ROMAP_MAG_CALSCD.FMT" */ ject definition :</pre>
OBJECT NAME DATA_TYPE START_BYTE BYTES DESCRIPTION	<pre>= COLUMN = "UTC" = TIME = 1 = 23 = "This column represents the UTC</pre>
END_OBJECT	= COLUMN
NAME DATA_TYPE START_BYTE BYTES UNIT FORMAT	<pre>= COLUMN = "OBT" = ASCII_REAL = 25 = 15 = SECOND = "F15.5" = "ROMAP 4 bytes counter representing the measurement time synchronized with Lander On Board Time. The time resolution is 0.03125 s"</pre>
END_OBJECT	= COLUMN
NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT	<pre>= COLUMN = "POS_X" = ASCIT_REAL = 41 = 16 = "F16.3" = KILOMETER = "X component of the Spacecraft (Lander) position, ECLIPJ2000 coordinates"</pre>
END_OBJECT	= COLUMN
NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT	<pre>= COLUMN = "POS Y" = ASCIT_REAL = 58 = 16 = "F16.3" = KILOMETER = "Y component of the Spacecraft (Lander) position, ECLIPJ2000 coordinates"</pre>
END_OBJECT	= COLUMN
NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	<pre>= COLUMN = "POS_Z" = ASCII_REAL = 75 = 16 = "F16.3" = KILOMETER = "Z component of the Spacecraft (Lander) position,</pre>
—	

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OBJECT NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	<pre>= COLUMN = "BX" = ASCII_REAL = 92 = 8 = "F8.2" = NANOTESLA = "Magnetic field X compor draft calibrated, ECLIP = COLUMN</pre>	nent, 2J2000 coordinate	es"
END_OBJECT OBJECT NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION END_OBJECT	<pre>= COLUMN = COLUMN = "BY" = ASCII_REAL = 101 = 8 = "F8.2" = NANOTESLA = "Magnetic field Y comportion draft calibrated, ECLIPS = COLUMN</pre>		3
OBJECT NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION END_OBJECT	<pre>= COLUMN = "BZ" = ASCII_REAL = 110 = 8 = "F8.2" = NANOTESLA = "Magnetic field Z compor draft calibrated, ECLIPC = COLUMN</pre>		5 T

4.3.4.5 Description of Instrument

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

4.3.5 Simple Plasma Monitor Science Draft Calibrated Data Product Design (Level 3)

We understand by draft calibrated data energy and angle distributions in cm⁻²s⁻¹, ion currents in ADC units (signed 16 integers, no physical values since the CEM amplifications are not clear), Faraday cup currents in cm⁻², energy in eV and angle (elevation) in degrees. The energy tables and the correspondences between step numbers and energy and between step numbers and angle (elevation) is given in the following tables (Table 4-1, Table 4-2).

Step No	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
lon1/2 (deg)	-52	-47	-41	-34	-27	-21	-16	-11	-6	0	5	10	15	20	25	31
Table 4-1 Cori	respor	ndence	betw	een st	ep nur	nber a	nd ele	vation								

Step No "64"	0	1	2	3	4	5	6	7	8	9	10	11
Step No "32"		0		1		2		3		4		5
lon1/2 (eV)	38.6	42.6	46.6	50.6	54.6	59.9	65.3	70.6	77.3	83.9	90.6	98.6
Electron (eV)	0.35	0.42	0.49	0.56	0.63	0.7	0.84	0.98	1.12	1.3	1.47	1.75
Step No "64"	12	13	14	15	16	17	18	19	20	21	22	23
Step No "32"		6		7		8		9		10		11
lon1/2 (eV)	107	117	127	138	150	163	178	194	211	230	250	271



Electron (eV)

2.03 2.38 2.74 3.16 3.72 4.28 4.98 5.82 6.73 7.79 9.05 10.5

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Step No "64"	24	25	26	27	28	29	30	31	32	33	34	35
Step No "32"		12		13		14		15		16		17
lon1/2 (eV)	295	321	350	381	414	450	490	533	580	640	700	760
Electron (eV)	12.3	14.2	16.5	19.2	22.3	25.9	30.1	34.9	41.0	47.4	54.7	63.1
Step No "64"	36	37	38	39	40	41	42	43	44	45	46	47
Step No "32"		18		19		20		21		22		23
lon1/2 (eV)	820	900	980	1060	1160	1260	1360	1480	1620	1760	1920	2080
Electron (eV)	73.7	86.3	100	116	135	156	181	211	245	284	330	383
Step No "64"	48	49	50	51	52	53	54	55	56	57	58	59
Step No "32"		24		25		26		27		28		29
lon1/2 (eV)	2260	2460	2680	2920	3180	3460	3760	4080	4440	4820	5260	5720
Electron (eV)	445	517	600	695	810	937	1095	1274	1474	1716	1989	2316

Step No "64"	60	61	62	63
Step No "32"		30		31
lon1/2 (eV)	6220	6760	7360	8000
Electron (eV)	2684	3115	3621	4210

Step No "64"	0	1	2	3	4	5	6	7	8	9
Step No "32"		0		1		2		3		4
Far.Cup -"lons" (eV)	10.7	12.7	15	17.6	20.8	24.6	29.2	34.6	40.8	48.6
Far.Cup -"Electrons" (eV)	1	2								

Step No "64"	10	11	12	13	14	15	16	17	18	19
Step No "32"		5		6		7		8		9
Far.Cup -"lons" (eV)	57.6	67.8	80.2	95.2	113	133	160	190	224	264

Step No "64"	20	21	22	23	24	25	26	27	28	29
Step No "32"		10		11		12		13		14
Far.Cup -"lons" (eV)	314	370	440	520	614	730	864	1020	1204	1430

Step No "64"	30	31
Step No "32"		15
Far.Cup -"lons" (eV)	1690	2000
T / / / / / /		

Table 4-2 Correspondence between step number and energy

The ROMAP SPM draft calibrated science files have a format similar to the edited (level 2) data, i.e; each file contains data from several measurement cycles. The level 3 files contain in addition detectors orientation in ECLIP J2000 frame.

One cycle contains the following data (in raw or parameter modes):

Raw mode

SPM header:

- UTC, -
- OBT. -
- Status of SPM (from HK parameters in SC data frame) _
- Orientation of detectors in ECLIPJ2000 (see §2.2.1 for the orientation of sensors relative to S/C) _

16 (for different angles) energy distributions (cm⁻²s⁻¹ and current in nA) for lon1 and lon2 sensors,

1 energy distribution (current in nA) for Faraday Cup sensors,

1 energy distribution (cm⁻²s¹) for Electron sensors



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Parameter mode

SPM header (same as for raw mode)

1 energy distribution (cm⁻²s¹ and currents in nA) for lon1 and lon2 sensors,

- 1 angle distributions (cm⁻²s¹ and currents in nA) for lon1 and lon2 sensors,
- 1 energy distribution (current in nA) for Faraday Cup sensors (same format as raw mode),
- 1 energy distribution (cm⁻²s¹) for Electron sensors (same format as raw mode)

The table objects corresponding to the distributions are detailed in the following paragraphs.

4.3.5.1 File Characteristics Data Elements

The PDS file characteristic data elements for ROMAP SPM draft calibrated science data (level 3) are:

```
RECORD_TYPE = FIXED_LENGTH
RECORD_BYTES
FILE_RECORDS
LABEL_RECORDS
```

4.3.5.2 Data Object Pointers Identification Data Elements

The ROMAP SPM SC draft calibrated data are organized as ASCII tables. The data object pointers (^TABLE) reference TAB files.

4.3.5.3 Instrument and Detector Descriptive Data Elements

The following data identification elements provide additional information about the ROMAP-SPM data products.

INSTRUMENT HOST NAME	=	"ROSETTA-LANDER"
INSTRUMENT HOST ID	=	RL
INSTRUMENT ID	=	ROMAP
INSTRUMENT NAME	=	"ROSETTA LANDER MAGNETOMETER AND PLASMA MONITOR"
INSTRUMENT_TYPE	=	{"FLUXGATE MAGNETOMETER", "ELECTROSTATIC ANALYZER",
—		"FARADAY CUP" }
DETECTOR_ID	=	SPM
INSTRUMENT MODE ID	=	"N/A"
INSTRUMENT MODE DESC	=	"N/A"

4.3.5.4 Data Object Definition

Each TAB file contains a header describing the Instrument status and detectors orientation followed by the energy and angle distributions.

4.3.5.4.1 Ion spectrum definition (counts-energy-angle distribution), raw mode (channels 1 or 2)

OBJECT	=	ROMAP SPM RAW ION CN TABLE
NAME	=	ROMAP SPM RAW ION CN
INTERCHANGE FORMAT	=	ASCII
ROWS	=	32
^STRUCTURE	=	"ROMAP SPM RAWC ION CN.FMT"
COLUMNS	=	40
ROW BYTES	=	401
END_OBJECT	=	ROMAP_SPM_RAW_ION_CN_TABLE

The structure of the TABLE object is described in the file ROMAP_SPM_RAWC_ION_CN.FMT as follows:

IGEP Institut für Geophysik und extraterrestrische Physik	ROMAP EAICD	Document No. Issue/Rev. No. Date Page	RO-ROL-ROMAP-EAICD 1 / 1 14-July-2016 82
OBJECT NAME DATA_TYPE START_BYTE BYTES DESCRIPTION END OBJECT	<pre>= COLUMN = "UTC" = TIME = 1 = 23 = "This column represents</pre>	PDS standard fo	rmat
—	COLUMN = "OBT" = ASCII_REAL = 25 = 15 = SECOND = "F15.5" = "ROMAP 4 bytes counter re time synchronized with 1 The time resolution is 1	Lander On Board	
- OBJECT = NAME	The time resolution is COLUMN = "MODE" = CHARACTER = 42 = 9 = "N/A" = "N/A" = "SPM mode:	U.U3125 S"	
	raw or parameter" COLUMN		
OBJECT = NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	COLUMN = "EXPOSITION_TIME" = CHARACTER = 54 = 5 = "N/A" = "N/A" = "SPM exposition time set" short or long"	ting:	
FORMAT UNIT DESCRIPTION	COLUMN COLUMN = "CALIBRATION" = CHARACTER		
- OBJECT = NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT	COLUMN = "CEM_SUPPLY" = ASCII_INTEGER = 72 = 1 = "I1" = "N/A" = "SPM CEM supply setting:	"	
END_OBJECT =	step number from 1 to 5 COLUMN		

Institut für Geophysik und extraterrestrische Physik	ROMAP EAICD	Document No. Issue/Rev. No. Date Page	RO-ROL-ROMAP-EAICD 1 / 1 14-July-2016 83
OBJECT = NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	COLUMN = "RESOLUTION" = CHARACTER = 75 = 4 = "N/A" = "N/A" = "SPM resolution setting:		
END_OBJECT =	low or high" COLUMN		
	COLUMN = "ION_CHANNEL" = CHARACTER = 82 = 8 = "N/A" = "Ion channel status: Both_off Ion1 Ion2		
END_OBJECT =	Both_on" COLUMN		
OBJECT = NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	<pre>COLUMN = "EVEN_ODD" = CHARACTER = 93 = 8 = "N/A" = "N/A" = "Indicates whether all example are transmitted (64 for for 32 for low resolution) or alternatively. Takes the year odd or full"</pre>	ull resolution a even/odd energi	
END_OBJECT =	even_odd or full" COLUMN		
NAME DATA_TYPE START_BYTE BYTES FORMAT	COLUMN = "I1_X_ECLIPJ2000" = ASCII_REAL = 103 = 6 = "F6.3" = "N/A" = "X component of unit vect in ECLIPJ2000 coordinate	5	Ion 1 detector
END_OBJECT =	COLUMN		
NAME DATA_TYPE START_BYTE BYTES FORMAT	COLUMN = "I1_Y_ECLIPJ2000" = ASCII_REAL = 110 = 6 = "F6.3" = "N/A" = "Y component of unit vectors in ECLIPJ2000 coordinate		1 Ion 1 detector
END_OBJECT =	COLUMN		
NAME DATA_TYPE START_BYTE BYTES	COLUMN = "I1_Z_ECLIPJ2000" = ASCII_REAL = 117 = 6 = "F6.3"		

Institut für Geophysik und extraterrestrisc Physik	he ROMAP EAICD	Document No. Issue/Rev. No. Date Page	RO-ROL-ROMAP-EAICE 1 / 1 14-July-2016 84
UNIT	= "N/A"		
DESCRIPTION	= "Z component of unit ver in ECLIPJ2000 coordina		Ion 1 detector
END OBJECT	= COLUMN	665	
OBJECT	= COLUMN		
NAME	= "I2_X_ECLIPJ2000"		
DATA_TYPE	= ASCII_REAL		
START_BYTE BYTES	= 124		
FORMAT	= 6 = "F6.3"		
UNIT	= "N/A"		
DESCRIPTION	= "X component of unit ve	ctor aligned with	Ion 2 detector
	in ECLIPJ2000 coordina		
END_OBJECT	= COLUMN		
OBJECT	= COLUMN		
NAME	= "I2_Y_ECLIPJ2000"		
DATA_TYPE	= ASCII_REAL		
START_BYTE BYTES	= 131 = 6		
FORMAT	= 6 = "F6.3"		
UNIT	= "N/A"		
DESCRIPTION	= "Y component of unit ve	ctor aligned with	Ion 2 detector
END OB TECT	in ECLIPJ2000 coordina = COLUMN	tes"	
END_OBJECT			
OBJECT	= COLUMN		
NAME	= "I2_Z_ECLIPJ2000"		
DATA_TYPE START BYTE	= ASCII_REAL = 138		
BYTES	= 6		
FORMAT	= "F6.3"		
UNIT	= "N/A"		
DESCRIPTION	= "Z component of unit ver in ECLIPJ2000 coordina		Ion 2 detector
END_OBJECT	= COLUMN		
OBJECT	= COLUMN		
NAME	= "EL X ECLIPJ2000"		
DATA_TYPE	= ASCII_REAL		
START_BYTE	= 145		
BYTES	= 6 = "F6.3"		
FORMAT UNIT	= "N/A"		
DESCRIPTION	= "X component of unit ve	ctor aligned with	electron
	detector in ECLIPJ200	0 coordinates"	
END_OBJECT	= COLUMN		
OBJECT	= COLUMN		
NAME DATA TYPE	= "EL_Y_ECLIPJ2000" = ASCII REAL		
START BYTE	= 152		
BYTES	= 6		
FORMAT	= "F6.3"		
UNIT	= "N/A"		
DESCRIPTION	= "Y component of unit ve	-	electron
END_OBJECT	detector in ECLIPJ200 = COLUMN	u coordinates"	
- Object	= COLUMN		
NAME	= "EL Z ECLIPJ2000"		
	= ASCII REAL		
DATA TYPE			
START_BYTE	= 159		
START_BYTE BYTES	= 6		
START_BYTE			

IGEP TU Braunschweig	che ROMAP EAICD	Document No. Issue/Rev. No. Date Page	RO-ROL-ROMAP-EAICD 1 / 1 14-July-2016 85
	detector in ECLIPJ200	0 coordinates"	
END_OBJECT	= COLUMN		
OBJECT NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	<pre>= COLUMN = "FC_X_ECLIPJ2000" = ASCII_REAL = 166 = 6 = "F6.3" = "N/A" = "X component of unit ve in ECLIPJ2000 coordina</pre>		n Faraday cup
END_OBJECT	= COLUMN		
OBJECT NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	<pre>= COLUMN = "FC_Y_ECLIPJ2000" = ASCII_REAL = 173 = 6 = "F6.3" = "N/A" = "Y component of unit ve in ECLIPJ2000 coordina</pre>		n Faraday cup
END_OBJECT	= COLUMN	ites	
OBJECT NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	<pre>= COLUMN = "FC_Z_ECLIPJ2000" = ASCII_REAL = 180 = 6 = "F6.3" = "N/A" = "Z component of unit ve in ECLIPJ2000 coordina</pre>		n Faraday cup
END_OBJECT	= COLUMN	ites	
/* Add index and t /* Index colu /* Type colu	<pre>************************************</pre>	or I2CNT)	*/ */ */
	= COLUMN		
DATA_TYPE START_BYTE BYTES FORMAT	<pre>= "INDEX" = INTEGER = 187 = 5 = "I5" = "N/A" = "Measurement index" = COLUMN</pre>		
END_OBJECT	= COLUMN		
NAME DATA_TYPE START_BYTE BYTES FORMAT	<pre>= COLUMN = "TYPE" = CHARACTER = 194 = 5 = "N/A" = "N/A" = "Measurement type (I1CN = COLUMN</pre>	NT or I2CNT)"	
	* * * * * * * * * * * * * * * * * * * *		*/
NAME	= COLUMN = "ENERGY" = ASCII_REAL		

Institut für Geophysik und extraterrestrisc Physik	he ROMAP EAICD	Document No. Issue/Rev. No. Date Page	RO-ROL-ROMAP-EAICD 1 / 1 14-July-2016 86
START_BYTE	= 201		
BYTES	= 7		
FORMAT	= "F7.2"		
UNIT DESCRIPTION	= "ELECTRONVOLT"		
END OBJECT	= "Energy step" = COLUMN		
_	0011301		
OBJECT NAME	- "COLUMN		
DATA TYPE	<pre>= "COUNTS_ELEVATION_1" = ASCII_REAL</pre>		
START BYTE	= 209		
BYTES	= 8		
FORMAT	= "F8.2"		
UNIT	= "CM**-2*S**-1"		
DESCRIPTION	= "counts for elevation s	step 1"	
END_OBJECT	= COLUMN		
OBJECT	= COLUMN		
NAME	<pre>= "COUNTS_ELEVATION_2" = ASCII_REAL</pre>		
START_BYTE	= 218		
BYTES	= 8		
FORMAT	= "F8.2"		
UNIT DESCRIPTION	= "CM**-2*S**-1"	top 2"	
END OBJECT	= "counts for elevation s = COLUMN	step z	
	COLORIN		
OBJECT	= COLUMN		
NAME	<pre>= "COUNTS_ELEVATION_3" = ASCII_REAL</pre>		
DATA_TYPE	= ASCII_REAL		
START_BYTE	= 227		
BYTES FORMAT	= 8 = "F8.2"		
UNIT	= "CM**-2*S**-1"		
DESCRIPTION	= "counts for elevation s	step 3"	
END_OBJECT	= COLUMN		
OBJECT	= COLUMN		
NAME	= "COUNTS ELEVATION 4"		
DATA TYPE	= ASCII REAL		
	= 236 —		
BYTES	= 8		
FORMAT	= "F8.2"		
UNIT	= "CM**-2*S**-1" = "counts for elevation s		
DESCRIPTION		step 4"	
END_OBJECT	= COLUMN		
	= COLUMN		
NAME	<pre>= "COUNTS_ELEVATION_5" = ASCII_REAL = 245 = 8</pre>		
DATA_TYPE	= ASCII_REAL		
START_BYTE	= 245		
BYTES			
E ORMAT UNIT			
DESCRIPTION	- o = "F8.2" = "CM**-2*S**-1" = "counts for elevation s	step 5"	
END_OBJECT	= COLUMN	сер о	
_	- COLUMN		
	= COLUMN = "COUNTS ELEVATION 6"		
DATA TYPE	<pre>= "COUNTS_ELEVATION_6" = ASCII_REAL = 254</pre>		
START BYTE	= 254		
BYTES	= 8		
FORMAT	= "F8.2"		
UNIT	= "CM**-2*S**-1"		
DESCRIPTION	= "counts for elevation s	step 6 "	
END_OBJECT	= COLUMN		

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OBJECT	= COLUMN		
NAME	= "COUNTS_ELEVATION_7"		
DATA_TYPE	= ASCII REAL		
START BYTE	= 263		
BYTES	= 8		
FORMAT	= "F8.2" = "CM**-2*S**-1"		
UNIT	= "CM**-2*S**-1"		
	= "counts for elevation s	step 7 "	
END_OBJECT	= COLUMN		
OBJECT	= COLUMN		
DATA TYPE	<pre>= "COUNTS_ELEVATION_8" = ASCII_REAL</pre>		
START BYTE	= 272		
BYTES	= 8		
UNIT	= "F8.2" = "CM**-2*S**-1"		
DESCRIPTION	= "counts for elevation s	step 8 "	
	= COLUMN	*	
OBJECT	= COLUMN		
DATA TYPE	<pre>= "COUNTS_ELEVATION_9" = ASCII_REAL</pre>		
START BYTE	= 281		
BYTES	= 8		
	= "F8.2"		
UNIT	= "F8.2" = "CM**-2*S**-1"		
DESCRIPTION	= "counts for elevation s	step 9 "	
END_OBJECT	= COLUMN		
OBJECT	= COLUMN		
NAME	= "COUNTS ELEVATION 10"		
DATA TYPE	= ASCII_REAL		
START BYTE	= 290		
BYTES	= 8		
FORMAT	= "F8.2"		
UNIT	= "CM**-2*S**-1"		
DESCRIPTION	= "counts for elevation s	step 10 "	
END_OBJECT	= COLUMN		
OBJECT	= COLUMN		
NAME	= "COUNTS ELEVATION 11"		
DATA TYPE	= ASCII REAL		
START BYTE	= ASCII_REAL = 299		
BYTES	= 8		
	= "F8.2"		
UNIT	= "CM**-2*S**-1"		
DESCRIPTION	= "counts for elevation s	step 11 "	
END_OBJECT	= COLUMN		
OBJECT	= COLUMN		
NAME	= "COUNTS ELEVATION 12"		
DATA TYPE	= ASCII REAL		
START BYTE	= ASCII_REAL = 308		
BYTES	= 8		
FORMAT	= "F8.2"		
UNIT	= "CM**-2*S**-1"		
DESCRIPTION END OBJECT	<pre>= "counts for elevation : = COLUMN</pre>	step 12 "	
	COLOUM		
	= COLUMN		
NAME	= "COUNTS_ELEVATION_13"		
	= ASCII_REAL		
START_BYTE BYTES	= 317 = 8		
DIIES	- o		
FORMAT	= "F8.2"		

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DESCRIPTION END_OBJECT =	= "counts for elevation COLUMN	step 13 "	
FORMAT UNIT DESCRIPTION	<pre>COLUMN = "COUNTS_ELEVATION_14" = ASCII_REAL = 326 = 8 = "F8.2" = "CM**-2*S**-1" = "counts for elevation COLUMN</pre>	step 14 "	
START_BYTE BYTES FORMAT UNIT DESCRIPTION	<pre>COLUMN = "COUNTS_ELEVATION_15" = ASCII_REAL = 335 = 8 = "F8.2" = "CM**-2*S**-1" = "counts for elevation COLUMN</pre>	step 15 "	
NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	COLUMN = "COUNTS_ELEVATION_16" = ASCII_REAL = 344 = 8 = "F8.2" = "CM**-2*S**-1" = "counts for elevation COLUMN	step 16"	

4.3.5.4.2 Ion spectrum definition (current-energy-angle), raw mode (channels 1 or 2)

OBJECT	= ROMAP SPM RAW ION CR TABLE
NAME	= ROMAP_SPM_RAW_ION_CR
INTERCHANGE FORMAT	= ASCII
ROWS	= 32
^STRUCTURE	= "ROMAP_SPM_RAWC_ION_CR.FMT"
COLUMNS	= 40
ROW_BYTES	= 353
END_OBJECT	= ROMAP_SPM_RAW_ION_CR_TABLE

The structure of the TABLE object is described in the file ROMAP_SPM_RAWC_ION_CR.FMT as follows:

/* Contents of format file "ROMAP_SPM_RAWC_ION_CR.FMT" */ /* */ Ion spectrum definition (Level 3) /* (I1CRT or I2CRT), raw mode (channels 1 or 2) */ /* Include the HEADER at the beginning of each measurement */ = COLUMN OBJECT = "UTC" NAME = "UTC" = TIME DATA_TYPE START_BYTE = 1 = 23 = "This column represents the UTC BYTES DESCRIPTION Of the SPM spectrum in PDS standard format YYYY-MM-DDThh:mm:ss.sss" END OBJECT = COLUMN OBJECT = COLUMN = "OBT" NAME

TU Braunschweig	ROMAP EAICD	Document No. Issue/Rev. No. Date Page	RO-ROL-ROMAP-EAICD 1 / 1 14-July-2016 89
DATA_TYPE START_BYTE BYTES UNIT FORMAT DESCRIPTION	<pre>= ASCII_REAL = 25 = 15 = SECOND = "F15.5" = "ROMAP 4 bytes counter : time synchronized with The time resolution is</pre>	Lander On Board	measurement Time.
END_OBJECT	= COLUMN		
OBJECT NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	<pre>= COLUMN = "MODE" = CHARACTER = 42 = 9 = "N/A" = "N/A" = "SPM mode: raw or parameter"</pre>		
END_OBJECT	= COLUMN		
OBJECT NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	<pre>= COLUMN = "EXPOSITION_TIME" = CHARACTER = 54 = 5 = "N/A" = "N/A" = "SPM exposition time set short or long"</pre>	tting:	
END_OBJECT	= COLUMN		
OBJECT NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	<pre>= COLUMN = "CALIBRATION" = CHARACTER = 62 = 8 = "N/A" = "N/A" = "SPM calibration status active or inactive"</pre>	:	
END_OBJECT	= COLUMN		
FORMAT	= "CEM_SUPPLY" = ASCII_INTEGER = 72 = 1	: 5 "	
DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	<pre>= COLUMN = "RESOLUTION" = CHARACTER = 75 = 4 = "N/A" = "N/A" = "SPM resolution setting low or high"</pre>	:	
END_OBJECT	= COLUMN		
OBJECT NAME	= COLUMN = "ION_CHANNEL"		

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DA	TA TYPE	= CHARACTER		
	ART_BYTE	= 82		
	TES	= 8		
	RMAT	= "N/A"		
UN		= "N/A"		
DE	SCRIPTION	= "Ion channel status: Both_off Ion1 Ion2 Both on"		
END_OB	JECT =	= COLUMN		
OBJECT	=	= COLUMN		
NAI		= "EVEN ODD"		
		= CHARACTER		
	ART_BYTE	= 93		
	TES	= 8		
	RMAT	= "N/A" = "N/A"		
UN	SCRIPTION	= "N/A" = "Indicates whether all	energies	
יםט	SCRIFTION	are transmitted (64 for		and
		32 for low resolution) c		
		alternatively. Takes the		
		even_odd or full"		
END_OB	JECT =	= COLUMN		
OBJECT	=	= COLUMN		
NAI	ME	= "I1_X_ECLIPJ2000"		
	TA_TYPE	= ASCII_REAL		
	ART_BYTE	= 103		
	TES	= 6 = "F6.3"		
UN	RMAT TT	= "N/A"		
	SCRIPTION	= "X component of unit ve in ECLIPJ2000 coordina		n Ion 1 detector
END_OB	JECT =	= COLUMN		
OBJECT	=	= COLUMN		
NAI	ME	= "I1 Y ECLIPJ2000"		
DA	TA_TYPE	= ASCII_REAL		
ST.		= 110		
		= 6		
	RMAT IT	= "P6.3" = "N/A"		
UN. DE	SCRIPTION	= "Y component of unit ve	ctor aligned with	n Ion 1 detector
		in ECLIPJ2000 coordina		. 1011 1 00000001
END_OB	JECT =	= COLUMN		
OBJECT	=	= COLUMN		
NA	ME	= "I1_Z_ECLIPJ2000"		
DA	TA_TYPE	= COLUMN = "I1_Z_ECLIPJ2000" = ASCII_REAL = 117		
ST	AKT_BYTE	= 117 = 6		
	-	= 6 = "F6.3"		
UN		= "N/A"		
		= "Z component of unit ve in ECLIPJ2000 coordina		n Ion 1 detector
END OB	JECT =		-	
OBJECT	=	= COLUMN		
NA		= "I2_X_ECLIPJ2000"		
DA'	TA_TYPE	= ASCII_REAL = 124		
	-	= 6 = "F6.3"		
	T/T-TU-T T	- ru.s		
F O.	RMAT IT	= "N/A"		

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END_OBJECT	= COLUMN		
OBJECT NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	<pre>= COLUMN = "I2_Y_ECLIPJ2000" = ASCII_REAL = 131 = 6 = "F6.3" = "N/A" = "N/A" = "Y component of unit in ECLIPJ2000 coordi</pre>		h Ion 2 detector
END_OBJECT	= COLUMN		
OBJECT NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	<pre>= COLUMN = "I2_Z_ECLIPJ2000" = ASCII_REAL = 138 = 6 = "F6.3" = "N/A" = "Z component of unit in ECLIPJ2000 coordi</pre>		h Ion 2 detector
END_OBJECT	= COLUMN	nates	
OBJECT NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	<pre>= COLUMN = "EL_X_ECLIPJ2000" = ASCTI_REAL = 145 = 6 = "F6.3" = "N/A" = "X component of unit detector in ECLIPJ2</pre>		h electron
END_OBJECT	= COLUMN	000 coordinates	
OBJECT NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	<pre>= COLUMN = "EL_Y_ECLIPJ2000" = ASCII_REAL = 152 = 6 = "F6.3" = "N/A" = "Y component of unit detector in ECLIPJ2</pre>		h electron
END_OBJECT	= COLUMN		
NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	<pre>= COLUMN = "EL_Z_ECLIPJ2000" = ASCII_REAL = 159 = 6 = "F6.3" = "N/A" = "Z component of unit detector in ECLIPJ2</pre>	vector aligned with 000 coordinates"	h electron
END_OBJECT	= COLUMN		
FORMAT UNIT	<pre>= COLUMN = "FC X_ECLIPJ2000" = ASCII_REAL = 166 = 6 = "F6.3" = "N/A" = "X component of unit</pre>		h Faraday cup
	in ECLIPJ2000 coordi		

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OBJECT NAME DATA_TYPE START_BYTE BYTES FORMAT	= COLUMN = "FC_Y_ECLIPJ2000" = ASCII_REAL = 173 = 6 = "F6.3"		
UNIT DESCRIPTION	<pre>= "N/A" = "Y component of unit v in ECLIPJ2000 coordin</pre>		Faraday cup
END_OBJECT	= COLUMN		
OBJECT NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT	= COLUMN = "FC_Z_ECLIPJ2000" = ASCII_REAL = 180 = 6 = "F6.3" = "N/A"		
DESCRIPTION END OBJECT	<pre>= "Z component of unit v</pre>		Faraday cup
/* Add index and t /* Index colu /* Type colu	<pre>************************************</pre>	RT or I2CRT)	* / * / * /
DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION END_OBJECT	<pre>= CHARACTER = 194 = 5 = "N/A" = "N/A" = "Measurement type (IIC = COLUMN</pre>	CRT or I2CRT)"	
/* ********	* * * * * * * * * * * * * * * * * * * *	* * * * * * * * * * * * * * * * * *	/
OBJECT NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION END_OBJECT	<pre>= COLUMN = "ENERGY" = ASCII_REAL = 201 = 7 = "F7.2" = "ELECTRONVOLT" = "Energy step" = COLUMN</pre>		
- OBJECT DATA_TYPE START_BYTE BYTES FORMAT UNIT	<pre>= COLUMN = "CURRENT_ELEVATION_1" = ASCII_REAL = 209 = 6 = "F6.3" = "MICROAMPERE"</pre>		

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DESCRIPTION END_OBJECT	<pre>= "Current for elevation = COLUMN</pre>	step 1 (-31 deg)"	
BYTES FORMAT	<pre>= COLUMN = "CURRENT_ELEVATION_2" = ASCII_REAL = 216 = 6 = "F6.3" = "MICROAMPERE" = "Current for elevation = COLUMN</pre>	step 2"	
BYTES FORMAT	<pre>= COLUMN = "CURRENT_ELEVATION_3" = ASCII_REAL = 223 = 6 = "F6.3" = "MICROAMPERE" = "Current for elevation = COLUMN</pre>	step 3"	
- OBJECT DATA_TYPE START_BYTE BYTES FORMAT	<pre>= COLUMN = "CURRENT_ELEVATION_4" = ASCII_REAL = 230 = 6 = "F6.3" = "MICROAMPERE" = "Current for elevation = COLUMN</pre>	step 4"	
NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION END OBJECT	= 237 = 6 = "F6.3" = "MICROAMPERE" = "Current for elevation = COLUMN	step 5"	
UNIT DESCRIPTION END_OBJECT	<pre>= COLUMN = "CURRENT_ELEVATION_6" = ASCII_REAL = 244 = 6 = "F6.3" = "MICROAMPERE" = "Current for elevation = COLUMN</pre>	step 6 "	
OBJECT NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION END_OBJECT	<pre>= COLUMN = "CURRENT_ELEVATION_7" = ASCII_REAL = 251 = 6 = "F6.3" = "MICROAMPERE" = "Current for elevation = COLUMN</pre>	step 7 "	
OBJECT NAME	= COLUMN = "CURRENT_ELEVATION_8"		

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BYTES FORMAT UNIT	<pre>= ASCII_REAL = 258 = 6 = "F6.3" = "MICROAMPERE" = "Current for elevation s = COLUMN</pre>	step 8 "	
NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	<pre>= COLUMN = "CURRENT_ELEVATION_9" = ASCII_REAL = 265 = 6 = "F6.3" = "MICROAMPERE" = "Current for elevation s = COLUMN</pre>	step 9 "	
NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT	<pre>= COLUMN = "CURRENT_ELEVATION_10" = ASCII_REAL = 272 = 6 = "F6.3" = "MICROAMPERE" = "Current for elevation s = COLUMN</pre>	step 10 "	
DATA_TYPE START_BYTE BYTES FORMAT UNIT	<pre>= COLUMN = "CURRENT_ELEVATION_11" = ASCII_REAL = 279 = 6 = "F6.3" = "MICROAMPERE" = "Current for elevation s = COLUMN</pre>	step 11 "	
DATA_TYPE START_BYTE BYTES FORMAT	<pre>= 286 = 6 = "F6.3" = "MICROAMPERE" = "Current for elevation s</pre>	step 12 "	
FORMAT	= "Current for elevation s	step 13 "	
OBJECT NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION END_OBJECT	<pre>= COLUMN = "CURRENT_ELEVATION_14" = ASCII_REAL = 300 = 6 = "F6.3" = "MICROAMPERE" = "Current for elevation s = COLUMN</pre>	step 14 "	

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OBJECT NAME DATA_TYPE START_BYTE BYTES FORMAT	<pre>= COLUMN = "CURRENT_ELEVATION_15" = ASCII_REAL = 307 = 6 = "E6 3"</pre>		

FORMAT UNIT DESCRIPTION END_OBJECT	<pre>= "F6.3" = "MICROAMPERE" = "Current for elevation step 15 " = COLUMN</pre>
OBJECT NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION END_OBJECT	<pre>= COLUMN = "CURRENT_ELEVATION_16" = ASCII_REAL = 314 = 6 = "F6.3" = "MICROAMPERE" = "Current for elevation step 16" = COLUMN</pre>

4.3.5.4.3 Ion spectrum definition (counts-energy distribution), parameter mode (channels 1 or 2)

OBJECT	= ROMAP_SPM_PAR_ION_CNE_TABLE
NAME	= ROMAP_SPM_PAR_ION_CNE
INTERCHANGE_FORMAT	= ASCII
ROWS	= 640
^STRUCTURE	= "ROMAP_SPM_PARC_ION_CNE.FMT"
COLUMNS	= 26
ROW_BYTES	= 240
END_OBJECT	= ROMAP_SPM_PAR_ION_CNE_TABLE

The structure of the TABLE object is described in the file ROMAP_SPM_PARC_ION_CNE.FMT as follows:

```
Contents of format file "ROMAP_SPM_PARC_ION_CNE.FMT"
/*
                                                             */
/*
                                                             */
                Ion spectrum definition (Level 3)
/*
     (I1CNTE, I2CNTE), parameter mode (channels 1 or 2)
                                                             */
/* Include the HEADER at the beginning of each measurement
                                                   */
OBJECT
                 = COLUMN
                 = "UTC"
   NAME
                 = TIME
   DATA TYPE
   START_BYTE
                 = 1
                 = 23
   BYTES
                  = "This column represents the UTC
   DESCRIPTION
                    Of the SPM spectrum in PDS standard format
                    YYYY-MM-DDThh:mm:ss.sss"
END_OBJECT
                  = COLUMN
OBJECT
               = COLUMN
                 = "OBT"
   NAME
   DATA TYPE
                 = ASCII REAL
   START_BYTE
                 = 25
                 = 15
   BYTES
   UNIT
                 = SECOND
                 = "F15.5"
   FORMAT
                 = "ROMAP 4 bytes counter representing the measurement
   DESCRIPTION
                    time synchronized with Lander On Board Time.
                   The time resolution is 0.03125 s"
END OBJECT
               = COLUMN
OBJECT
               = COLUMN
                 = "MODE"
  NAME
```

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DATA TYPE	= CHARACTER		
START_BYTE	= 42		
BYTES	= 9		
FORMAT	= "N/A"		
UNIT DESCRIPTION	= "N/A"		
DESCRIPTION	- SFM mode: raw or parameter"		
END_OBJECT	= COLUMN		
OBJECT	= COLUMN		
NAME	= "EXPOSITION_TIME" = CHARACTER = 54		
DATA_TYPE	= CHARACTER		
SIARI_DIIE	= 54		
BYTES	= 5		
FORMAT	= "N/A"		
UNIT	= "N/A"	cotting.	
DESCRIPTION	= "SPM exposition time short or long"	secting.	
END_OBJECT	= COLUMN		
OBJECT	= COLUMN		
NAME	<pre>= "CALIBRATION" = CHARACTER</pre>		
	= CHARACTER		
START_BYTE	= 62		
BYTES	= 8		
	= "N/A"		
UNIT DESCRIPTION	= "N/A" = "SPM calibration sta	+110.	
DESCRIPTION	active or inactive"	cus.	
END_OBJECT	= COLUMN		
OBJECT	= COLUMN		
	= "CEM SUPPLY"		
	= ASCII_INTEGER		
START_BYTE	= 72 -		
BYTES	= 1		
FORMAT	= "I1"		
UNIT	= "N/A"		
DESCRIPTION	= "SPM CEM supply sett		
END OBJECT	step number from 1 = COLUMN	to 5"	
—			
OBJECT	= COLUMN		
NAME	= "RESOLUTION"		
DATA TYPE	= "RESOLUTION" = CHARACTER = 75		
START_BITE	= / C =		
BYTES FORMAT	= 4 = "N/A"		
UNIT	= "N/A"		
DESCRIPTION	= "SPM resolution sett	ing:	
	= "SPM resolution sett low or high"		
END_OBJECT	5		
OBJECT	= COLUMN		
NAME	= "ION_CHANNEL" = CHARACTER		
DATA_TYPE	= CHARACTER		
START_BYTE BYTES	= 82		
FORMAT	= "N/A"		
UNIT	= "N/A" = "Ion channel status:		
DESCRIPTION	Both off		
	Ion1		
	Ion2		
	Both_on"		

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OBJECT = NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	COLUMN = "EVEN_ODD" = CHARACTER = 93 = 8 = "N/A" = "N/A" = "Indicates whether all e are transmitted (64 for f 32 for low resolution) or alternatively. Takes the even odd or full"	full resolution a r even/odd energi	
END_OBJECT =	COLUMN		
	COLUMN = "I1_X_ECLIPJ2000" = ASCII_REAL = 103 = 6 = "F6.3" = "N/A" = "X component of unit vector		Ion 1 detector
END_OBJECT =	in ECLIPJ2000 coordinat COLUMN	ces"	
OBJECT = NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	<pre>COLUMN = "I1_Y_ECLIPJ2000" = ASCII_REAL = 110 = 6 = "F6.3" = "N/A" = "Y component of unit vec in ECLIPJ2000 coordinat</pre>		Ion 1 detector
END_OBJECT =	COLUMN	.es	
NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	<pre>COLUMN = "I1_Z_ECLIPJ2000" = ASCII_REAL = 117 = 6 = "F6.3" = "N/A" = "Z_component of unit vec in ECLIPJ2000 coordinat COLUMN</pre>		Ion 1 detector
NAME DATA_TYPE START_BYTE BYTES FORMAT	= 124 = 6 = "F6.3" = "N/A"		1 Ion 2 detector
END_OBJECT =	COLUMN		
NAME DATA_TYPE START_BYTE BYTES	<pre>COLUMN = "I2 Y ECLIPJ2000" = ASCII_REAL = 131 = 6 = "F6.3" = "N/A" = "Y component of unit vec in ECLIPJ2000 coordinat</pre>		1 Ion 2 detector

ie aunschw	Veig Institut für Geophysik und extraterrestrische Physik	ROMAP EAICD	Document No. Issue/Rev. No. Date Page	RO-ROL-ROMAP-EAICD 1 / 1 14-July-2016 98
end_	OBJECT	= COLUMN		
	CT	= 138 = 6 = "F6.3" = "N/A"		1 Ion 2 detector
end_	OBJECT =	= COLUMN	.65	
	NAME	<pre>= COLUMN = "EL_X_ECLIPJ2000" = ASCII_REAL = 145 = 6 = "F6.3" = "N/A" = "X component of unit vec </pre>		a electron
end_	OBJECT -	detector in ECLIPJ2000 = COLUMN	coordinates"	
	NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	<pre>= COLUMN = "EL_Y_ECLIPJ2000" = ASCTI_REAL = 152 = 6 = "F6.3" = "N/A" = "Y component of unit vec detector in ECLIPJ2000</pre>		electron
end_	OBJECT =	= COLUMN		
	CT : NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	<pre>= COLUMN = "EL_Z_ECLIPJ2000" = ASCTI_REAL = 159 = 6 = "F6.3" = "N/A" = "Z component of unit vec detector in ECLIPJ2000</pre>		electron
end_	OBJECT =	= COLUMN		
	NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	<pre>= COLUMN = "FC_X_ECLIPJ2000" = ASCTI_REAL = 166 = 6 = "F6.3" = "N/A" = "X component of unit vec in ECLIPJ2000 coordinat</pre>		Faraday cup
end_	OBJECT =	= COLUMN		
	NAME DATA_TYPE START_BYTE BYTES FORMAT	= 173 = 6 = "F6.3" = "N/A" = "Y component of unit vec		Faraday cup
		in ECLIPJ2000 coordinat		

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OBJECT = NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	COLUMN = "FC_Z_ECLIPJ2000" = ASCII_REAL = 180 = 6 = "F6.3" = "N/A" = "Z component of unit vec in ECLIPJ2000 coordinat		Faraday cup
- /* ************************ /* Add index and typ /* Index column /* Type column	: measurement number : measurement type (I1CNTE	, I2CNTE)	*/ */ */
OBJECT = NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	<pre>************************************</pre>	****	* */
- OBJECT = NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	COLUMN = "TYPE" = CHARACTER = 194 = 6 = "N/A" = "N/A" = "Measurement type (I1CNT COLUMN	'E, I2CNTE)"	
_	****	******	./
NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	COLUMN = "ENERGY" = ASCII_REAL = 202 = 7 = "F7.2" = "ELECTRONVOLT" = "Energy step" COLUMN		
NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	COLUMN = "COUNTS" = ASCII_REAL = 210 = 10 = "F10.2" = "CM**-2*S**-1" = "Sum of counts for elevel COLUMN	tion steps 1 to	16"
BYTES	<pre>= COLUMN = "OVERFLOW FLAG" = CHARACTER = 222 = 16 = "N/A" = "N/A"</pre>		

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tc	ring of 16 characters an elevation step an lues : 0 : No overfl 1 : Overflow"	d may take one o	
END_OBJECT = COL			
4.3.5.4.4 Ion spectrum definiti OBJECT NAME INTERCHANGE_FORMAT ROWS ^STRUCTURE COLUMNS ROW_BYTES END_OBJECT	<pre>ion (current-energy distribut) = ROMAP_SPM_PAR_ION = ROMAP_SPM_PAR_ION = ASCII = 640 = "ROMAP_SPM_PARC_II = 26 = 237 = ROMAP_SPM_PAR_ION</pre>	_CRE_TABLE _CRE ON_CRE.FMT"	ode (channels 1 or 2)
The structure of the TABLE obje as follows:	ect is described in the file	ROMAP_ROMAP_	SPM_PARC_ION_CRE.FMT
/* Ion s	of format file "ROMAP pectrum definition rameter mode (channel	(Level 3) s 1 or 2)	*/ */

/	,
	<pre>= "UTC" = TIME = 1 = 23 = "This column represents the UTC Of the SPM spectrum in PDS standard format YYYY-MM-DDThh:mm:ss.sss"</pre>
END_OBJECT	= COLUMN
NAME DATA_TYPE START_BYTE BYTES UNIT FORMAT	<pre>= COLUMN = "OBT" = ASCII_REAL = 25 = 15 = SECOND = "F15.5" = "ROMAP 4 bytes counter representing the measurement time synchronized with Lander On Board Time. The time resolution is 0.03125 s"</pre>
END_OBJECT	= COLUMN
NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	= 9 = "N/A" = "N/A" = "SPM mode: raw or parameter"
END_OBJECT	= COLUMN
OBJECT NAME DATA_TYPE START_BYTE BYTES	<pre>= COLUMN = "EXPOSITION_TIME" = CHARACTER = 54 = 5</pre>

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FORMAT UNIT DESCRIPTION	= "N/A" = "N/A" = "SPM exposition time set	ting:	
END_OBJECT =	short or long" COLUMN		
OBJECT = NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	COLUMN = "CALIBRATION" = CHARACTER = 62 = 8 = "N/A" = "N/A" = "SPM calibration status: active or inactive"		
END_OBJECT =	COLUMN		
NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	COLUMN = "CEM_SUPPLY" = ASCII_INTEGER = 72 = 1 = "I1" = "N/A" = "SPM CEM supply setting: step number from 1 to 5 COLUMN	n	
—	COLUMN		
NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	<pre>= "RESOLUTION" = CHARACTER = 75 = 4 = "N/A" = "N/A" = "SPM resolution setting:</pre>		
END_OBJECT =	low or high" COLUMN		
OBJECT = NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	COLUMN = "ION_CHANNEL" = CHARACTER = 82 = 8 = "N/A" = "Ion channel status: Both_off Ion1 Ion2		
END_OBJECT =	Both_on" COLUMN		
NAME DATA_TYPE	COLUMN = "EVEN_ODD" = CHARACTER = 93 = 8 = "N/A" = "N/A" = "Indicates whether all e are transmitted (64 for f 32 for low resolution) or alternatively. Takes the	ull resolution a even/odd energi	
END_OBJECT =	alternatively. Takes the even_odd or full" COLUMN	varueð.	

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OBJECT = NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	COLUMN = "I1_X_ECLIPJ2000" = ASCII_REAL = 103 = 6 = "F6.3" = "N/A" = "X component of unit ve in ECLIPJ2000 coordina		Ion 1 detector
END_OBJECT =	COLUMN		
OBJECT = NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	COLUMN = "I1_Y_ECLIPJ2000" = ASCII_REAL = 110 = 6 = "F6.3" = "N/A" = "Y_component of unit ve in ECLIPJ2000 coordina		Ion 1 detector
END_OBJECT =	COLUMN		
OBJECT = NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	COLUMN = "I1_Z_ECLIPJ2000" = ASCII_REAL = 117 = 6 = "F6.3" = "N/A" = "Z component of unit ve in ECLIPJ2000 coordina		Ion 1 detector
_	COLUMN COLUMN = "I2 X ECLIPJ2000" = ASCII_REAL = 124 = 6 = "F6.3" = "N/A" = "X component of unit ve in ECLIPJ2000 coordina	ctor aligned with	Ion 2 detector
END_OBJECT =	COLUMN	663	
NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT	COLUMN = "I2_Y_ECLIPJ2000" = ASCII_REAL = 131 = 6 = "F6.3" = "N/A" = "Y component of unit ve in ECLIPJ2000 coordina COLUMN	ctor aligned with tes"	Ion 2 detector
—			
NAME DATA_TYPE START_BYTE BYTES FORMAT	COLUMN = "I2_Z_ECLIPJ2000" = ASCII_REAL = 138 = 6 = "F6.3" = "N/A" = "Z_component of unit ve in ECLIPJ2000 coordina	ctor aligned with tes"	Ion 2 detector
END_OBJECT =			
OBJECT = NAME	COLUMN = "EL X ECLIPJ2000"		

DATA TYPE		Page	14-July-2016 103
START_BYTE BYTES FORMAT UNIT DESCRIPTION	<pre>= ASCII_REAL = 145 = 6 = "F6.3" = "N/A" = "X component of unit vec detector in ECLIPJ2000</pre>		electron
END_OBJECT	= COLUMN		
OBJECT NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	<pre>= COLUMN = "EL_Y_ECLIPJ2000" = ASCII_REAL = 152 = 6 = "F6.3" = "N/A" = "Y component of unit vec</pre>	tor aligned with	electron
END OBJECT	detector in ECLIPJ2000 = COLUMN	coordinates"	
- OBJECT DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	<pre>= COLUMN = "EL_Z_ECLIPJ2000" = ASCII_REAL = 159 = 6 = "F6.3" = "N/A" = "Z_component of unit vec</pre>	-	electron
END OBJECT	detector in ECLIPJ2000 = COLUMN	coordinates"	
OBJECT NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	<pre>= COLUMN = "FC_X_ECLIPJ2000" = ASCII_REAL = 166 = 6 = "F6.3" = "N/A" = "X component of unit vec</pre>	tor aligned with	Faraday cup
END_OBJECT	in ECLIPJ2000 coordinat = COLUMN	es"	
UNIT	<pre>= COLUMN = "FC Y_ECLIPJ2000" = ASCII_REAL = 173 = 6 = "F6.3" = "N/A" = "Y component of unit vec in ECLIPJ2000 coordinat</pre>		Faraday cup
END_OBJECT	= COLUMN		
BITES FORMAT UNIT	<pre>= COLUMN = "FC_Z_ECLIPJ2000" = ASCII_REAL = 180 = 6 = "F6.3" = "N/A" = "Z_component of unit vec </pre>	tor aligned with	Faraday cup
END_OBJECT	in ECLIPJ2000 coordinat = COLUMN	es"	

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/* Type columr /* **************	n : measurement type (I1CRT)	E, I2CRTE) ***************	*/
NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT	<pre>= COLUMN = "INDEX" = INTEGER = 187 = 5 = "I5" = "N/A" = "Measurement index" = COLUMN</pre>		
OBJECT = NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT	<pre>COLUMN = "TYPE" = CHARACTER = 194 = 6 = "N/A" = "N/A" = "Measurement type (I1CR' = COLUMN</pre>	TE, I2CRTE)"	
OBJECT = NAME DATA_TYPE START_BYTE BYTES	<pre>************************************</pre>	************	1
DESCRIPTION	= "ELECTRONVOLT" = "Energy bin number" = COLUMN		
- OBJECT = DATA_TYPE START_BYTE BYTES FORMAT UNIT	= COLUMN = "CURRENT"	evation steps 1 t	:o 16"
	= COLUMN	_	
	= COLUMN		
OBJECT NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	<pre>= "OVERFLOW FLAG" = CHARACTER = 218 = 16 = "N/A" = "N/A" = "String of 16 character: to an elevation step at values : 0 : No overf. 1 : Overflow</pre>	nd may take one c low	

4.3.5.4.5 Ion spectrum definition (counts-angle distribution), parameter mode (channels 1 or 2)

OBJECT	= ROMAP SPM PAR ION CNA TABLE		
NAME	= ROMAP SPM PAR ION CNA		
INTERCHANGE_FORMAT	= ASCII		
ROWS	= 320		
^STRUCTURE	= "ROMAP SPM PARC ION CNA.FMT"		
COLUMNS	= 26		
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--	--	--	--
ROW_BYTES END OBJECT	= 288 = ROMAP_SPM_PAR_I	ON CNA TARIE	
—			
The structure of the	TABLE object is described in the file	e ROMAP_SPM_PA	RC_ION_CNA.FMT as follows
/* (/*	Contents of format file "ROM Ion spectrum definition		NA.FMT" */ */
,	2CNTA), parameter mode (chann		*/
,	*****		1
	EADER at the beginning of eac. ************************************		*/ * */
OBJECT	= COLUMN		
NAME	= "UTC"		
DATA_TYPE	= TIME		
START_BYTE	= 1		
BYTES DESCRIPTION	= 23 = "This column represen	ts the UTC	
PROCIVICITON	Of the SPM spectrum		ormat
	YYYY-MM-DDThh:mm:ss.		
END_OBJECT	= COLUMN		
OBJECT	= COLUMN		
NAME	= "OBT"		
DATA_TYPE	= ASCII_REAL		
START_BYTE	= 25		
BYTES	= 15		
UNIT	= SECOND		
FORMAT	= "F15.5"	roproconting the	maaguramant
DESCRIPTION	<pre>= "ROMAP 4 bytes counter time synchronized wit.""""""""""""""""""""""""""""""""""""</pre>	h Lander On Board	
END_OBJECT	The time resolution i = COLUMN	5 0.03125 5"	
OBJECT	= COLUMN		
NAME	= "MODE"		
DATA_TYPE	= CHARACTER		
START_BYTE	= 42		
BYTES	= 9		
FORMAT UNIT	= "N/A"		
DESCRIPTION	<pre>= "SPM mode: raw or parameter"</pre>		
END_OBJECT	= COLUMN		
OBJECT	= COLUMN		
NAME	= "EXPOSITION_TIME" = CHARACTER		
DATA_TYPE	= CHARACTER		
START BYTE	= 54		
BYTES FORMAT	= 5		
UNIT	= "N/A"		
DESCRIPTION	= "SPM exposition time s	etting:	
END_OBJECT	SHOLE OF TONY		
OBJECT	= COLUMNI		
NAME	= COLUMN = "CALIBRATION"		
DATA TYPE	<pre>= "CALIBRATION" = CHARACTER</pre>		
START BYTE	= 62		
START_BYTE BYTES	= 62 = 8		
FORMAT UNIT	= "N/A"		
UNIT	= "N/A"		
DESCRIPTION	= "SPM calibration statu	s:	
	active or inactive"		
END OBJECT	= COLUMN		



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FORMAT UNIT DESCRIPTION END_OBJECT =	<pre>= "F6.3" = "N/A" = "Y component of unit vec in ECLIPJ2000 coordinat COLUMN</pre>		Ion 1 detector
NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	COLUMN = "I1_Z_ECLIPJ2000" = ASCII_REAL = 117 = 6 = "F6.3" = "N/A" = "Z component of unit vec in ECLIPJ2000 coordinat COLUMN		Ion 1 detector
NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	COLUMN = "I2_X_ECLIPJ2000" = ASCII_REAL = 124 = 6 = "F6.3" = "N/A" = "X component of unit vec in ECLIPJ2000 coordinat COLUMN		Ion 2 detector
—	COLUMN = "I2_Y_ECLIPJ2000" = ASCII_REAL = 131 = 6 = "F6.3" = "N/A" = "Y component of unit vec in ECLIPJ2000 coordinat		Ion 2 detector
- OBJECT = NAME DATA_TYPE START_BYTE BYTES FORMAT	COLUMN = "I2_Z_ECLIPJ2000" = ASCII_REAL = 138 = 6 = "F6.3" = "N/A" = "Z_component of unit vectors		Ion 2 detector
—	in ECLIPJ2000 coordinat COLUMN	ces"	
	COLUMN = "EL_X_ECLIPJ2000" = ASCII_REAL = 145 = 6 = "F6.3" = "N/A" = "X component of unit vec detector in ECLIPJ2000	-	electron
END_OBJECT =	COLUMN	Coordinates"	
OBJECT = NAME DATA_TYPE START_BYTE BYTES FORMAT	COLUMN = "EL_Y_ECLIPJ2000" = ASCII_REAL = 152 = 6 = "F6.3"		

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UNIT DESCRIPTION END_OBJECT =	<pre>= "N/A" = "Y component of unit vec detector in ECLIPJ2000 COLUMN</pre>		electron
OBJECT = NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	COLUMN = "EL_Z_ECLIPJ2000" = ASCII_REAL = 159 = 6 = "F6.3" = "N/A" = "Z component of unit vec detector in ECLIPJ2000		electron
—	COLUMN = "FC_X_ECLIPJ2000" = ASCII_REAL = 166 = 6 = "F6.3"	coordinates	
UNIT DESCRIPTION	<pre>= "N/A" = "X component of unit vec in ECLIPJ2000 coordinat COLUMN</pre>	tor aligned with es"	Faraday cup
NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	COLUMN = "FC_Y_ECLIPJ2000" = ASCII_REAL = 173 = 6 = "F6.3" = "N/A" = "Y_component of unit vec in ECLIPJ2000 coordinat		Faraday cup
_	COLUMN = "FC_Z_ECLIPJ2000" = ASCII_REAL = 180 = 6 = "F6.3" = "N/A" = "Z_component of unit vec in ECLIPJ2000 coordinat		Faraday cup
- /* ********************************* /* Add index and typ /* Index column /* Type column	COLUMN	**************************************	*/ */ */
OBJECT = NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT	COLUMN = "INDEX" = INTEGER = 187 = 5 = "I5" = "N/A" = "Measurement index"		/
END_OBJECT =	COLUMN		
OBJECT = NAME	COLUMN = "TYPE"		

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DATA TYPE	= CHARACTER		
START BYTE	= 194		
BYTES	= 6		
FORMAT	= "N/A"		
UNIT	= "N/A"		
	= "Measurement type (I1	CNTA or I2CNTA)"	
END_OBJECT	= COLUMN		
/* **************	* * * * * * * * * * * * * * * * * * * *	*****	*/
	= COLUMN		
NAME	= "ANGLE "		
	= ASCII_REAL		
START_BYTE BYTES	= 202 = 7		
	- / = "F7.2"		
UNIT	= "DEGREE"		
DESCRIPTION	= "Elevation step"		
	= COLUMN		
OBJECT	= COLUMN		
NAME	= "COUNTS"		
	= ASCII_REAL		
START_BYTE	= 210		
BYTES	= 10 = "F10.2"		
FORMAT UNIT	= "CM**-2*S**-1"		
DESCRIPTION	= "Sum of counts for en	erav steps 0 to 31	
	Or 0 to 63"		
END_OBJECT	= COLUMN		
OBJECT	= COLUMN		
NAME	= "OVERFLOW FLAG"		
	= CHARACTER		
START_BYTE	= 222		
BYTES FORMAT	= 64 = "N/A"		
UNIT	= "N/A"		
DESCRIPTION	= "String of 64 charact	ers ; each charact	er corresponds
	to a step of energy values :		
	0 : No ove 1 : Overfl		
	I : OVERII In low resolution th	• ···	ers are unused
	and set to blank "	le 52 fast characte	is all unused
END OBJECT	= COLUMN		
—			
4.3.5.4.6 Ion spectrur	n definition (current-angle), pai	rameter mode (channe	els 1 or 2)
OBJECT	= ROMAP SPM PAR	ION CRA TABLE	
NAME	= ROMAP_SPM_PAR_		
INTERCHANGE_F		—	
ROWS	= 320		
^STRUCTURE	= "ROMAP_SPM_PAR	C_ION_CRA.FMT"	
COLUMNS	= 26		
ROW_BYTES	= 285	ION CRA TABLE	

The structure of the TABLE object is described in the file ROMAP_SPM_PARC_ION_CRA.FMT as follows:

= ROMAP_SPM_PAR_ION_CRA_TABLE

END_OBJECT

IGEP TU Braunschweig	e ROMAP EAICD	Document No. Issue/Rev. No. Date Page	RO-ROL-ROMAP-EAICD 1 / 1 14-July-2016 110
OBJECT NAME DATA_TYPE START_BYTE BYTES DESCRIPTION	<pre>= COLUMN = "UTC" = TIME = 1 = 23 = "This column represents</pre>	PDS standard fo	ormat
END_OBJECT	= COLUMN		
NAME	<pre>= COLUMN = "OBT" = ASCII_REAL = 25 = 15 = SECOND = "F15.5" = "ROMAP 4 bytes counter r time synchronized with The time resolution is</pre>	Lander On Board	
END_OBJECT	= COLUMN	0.00120 5	
NAME	<pre>= COLUMN = "MODE" = CHARACTER = 42 = 9 = "N/A" = "N/A" = "SPM mode: raw or parameter"</pre>		
END_OBJECT	= COLUMN		
NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT	<pre>= COLUMN = "EXPOSITION_TIME" = CHARACTER = 54 = 5 = "N/A" = "N/A" = "SPM exposition time set</pre>	ting:	
END_OBJECT	short or long" = COLUMN		
START_BYTE BYTES FORMAT UNIT	<pre>= "CALIBRATION" = CHARACTER = 62 = 8</pre>		
END_OBJECT			
NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT	<pre>= COLUMN = "CEM_SUPPLY" = ASCII_INTEGER = 72 = 1 = "I1" = "N/A" = "SPM CEM supply setting: step number from 1 to 5</pre>		
END_OBJECT	= COLUMN		

IGEP TU Braunschweig	ROMAP EAICD	Document No. Issue/Rev. No. Date Page	RO-ROL-ROMAP-EAICD 1 / 1 14-July-2016 111
OBJECT = NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	COLUMN = "RESOLUTION" = CHARACTER = 75 = 4 = "N/A" = "N/A" = "SPM resolution setting: low or high"		
END_OBJECT =	COLUMN		
OBJECT = NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	COLUMN = "ION_CHANNEL" = CHARACTER = 82 = 8 = "N/A" = "Ion channel status: Both_off Ion1 Ion2 Both_on"		
END_OBJECT =	Both_on" COLUMN		
OBJECT = NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	<pre>COLUMN = "EVEN_ODD" = CHARACTER = 93 = 8 = "N/A" = "Indicates whether all e are transmitted (64 for f 32 for low resolution) or alternatively. Takes the even odd or full"</pre>	full resolution a r even/odd energi	
END_OBJECT =	COLUMN		
NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	<pre>COLUMN = "I1_X_ECLIPJ2000" = ASCII_REAL = 103 = 6 = "F6.3" = "N/A" = "X component of unit vec in ECLIPJ2000 coordinat</pre>		n Ion 1 detector
END_OBJECT =	COLUMN		
NAME DATA_TYPE START_BYTE BYTES FORMAT	COLUMN = "I1_Y_ECLIPJ2000" = ASCII_REAL = 110 = 6 = "F6.3" = "N/A" = "Y component of unit vec in ECLIPJ2000 coordinat		n Ion 1 detector
END_OBJECT =	in ECLIPJ2000 coordinat COLUMN	262	
OBJECT = NAME DATA_TYPE START_BYTE BYTES FORMAT	COLUMN = "I1_Z_ECLIPJ2000" = ASCII_REAL = 117 = 6 = "F6.3"		

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UNIT	= "N/A"		
DESCRIPTION	= "Z component of unit ve in ECLIPJ2000 coordina		Ion 1 detector
END_OBJECT	= COLUMN		
DBJECT	= COLUMN		
NAME	= "I2_X_ECLIPJ2000"		
DATA_TYPE	= ASCII_REAL		
START_BYTE	= 124		
BYTES FORMAT	= 6 = "F6.3"		
UNIT	= "N/A"		
DESCRIPTION	= "X component of unit ve	ector aligned with	Ion 2 detector
	in ECLIPJ2000 coordina		
END_OBJECT	= COLUMN		
DBJECT	= COLUMN		
NAME	= "I2_Y_ECLIPJ2000"		
DATA_TYPE START BYTE	= ASCII_REAL = 131		
BYTES	= 6		
FORMAT	= "F6.3"		
UNIT	= "N/A"		
DESCRIPTION	= "Y component of unit ve		Ion 2 detector
END OBJECT	in ECLIPJ2000 coordina = COLUMN	ates"	
-			
OBJECT	= COLUMN		
NAME DATA TYPE	= "I2_Z_ECLIPJ2000" = ASCII REAL		
START BYTE	= 138		
BYTES	= 6		
FORMAT	= "F6.3"		
UNIT	= "N/A"		
DESCRIPTION	= "Z component of unit ve in ECLIPJ2000 coordina		Ion 2 detector
END_OBJECT	= COLUMN	aces	
OBJECT	= COLUMN		
NAME	= "EL X ECLIPJ2000"		
DATA TYPE	= ASCII REAL		
START_BYTE	= 145		
BYTES	= 6		
FORMAT	= "F6.3"		
UNIT DESCRIPTION	= "N/A" = "X component of unit ve	ector aligned with	electron
DECOULT 1101	detector in ECLIPJ20		010001011
END_OBJECT	= COLUMN		
DBJECT	= COLUMN		
NAME	= "EL_Y_ECLIPJ2000"		
DATA_TYPE	= ASCII_REAL		
START_BYTE BYTES	= 152 = 6		
FORMAT	= 6 = "F6.3"		
UNIT	= "N/A"		
DESCRIPTION	= "Y component of unit ve		electron
END_OBJECT	detector in ECLIPJ20 = COLUMN	uu coordinates"	
OBJECT	= COLUMN		
	= "EL_Z_ECLIPJ2000" = ASCII_REAL		
DATA_TYPE	—		
START_BYTE	= 159		
BYTES	= 159 = 6		
START_BYTE	= 159		

IGEP TU Braunschweig	che ROMAP EAICD	Document No. Issue/Rev. No. Date Page	RO-ROL-ROMAP-EAICD 1 / 1 14-July-2016 113
END_OBJECT	detector in ECLIPJ200 = COLUMN	0 coordinates"	
OBJECT NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	<pre>= COLUMN = "FC_X_ECLIPJ2000" = ASCII_REAL = 166 = 6 = "F6.3" = "N/A" = "X component of unit ve in ECLIPJ2000 coordina</pre>	ctor aligned with	n Faraday cup
END_OBJECT	= COLUMN		
OBJECT NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	<pre>= COLUMN = "FC_Y_ECLIPJ2000" = ASCTI_REAL = 173 = 6 = "F6.3" = "N/A" = "Y_component of unit ve in ECLIPJ2000 coordina</pre>		n Faraday cup
END_OBJECT	= COLUMN		
OBJECT NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	<pre>= COLUMN = "FC_Z_ECLIPJ2000" = ASCII_REAL = 180 = 6 = "F6.3" = "N/A" = "Z component of unit vertices of</pre>		n Faraday cup
END_OBJECT	in ECLIPJ2000 coordina = COLUMN	tes"	
/* Add index and t /* Index colu /* Type colu	<pre>************************************</pre>	A, I2CRTA)	* / * / * /
NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT	<pre>= COLUMN = "INDEX" = INTEGER = 187 = 5 = "I5" = "N/A" = "Measurement index" = COLUMN</pre>		
NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT	<pre>= COLUMN = "TYPE" = CHARACTER = 194 = 6 = "N/A" = "N/A" = "Measurement type (I1CR = COLUMN</pre>	TA, I2CRTA)"	
_	* * * * * * * * * * * * * * * * * * * *		* /
OBJECT NAME	= COLUMN = "ANGLE"		

IGEP TU Braunschweig	ROMAP EAICD	Document No. Issue/Rev. No. Date Page	RO-ROL-ROMAP-EAICD 1 / 1 14-July-2016 114
	<pre>= ASCII_REAL = 202 = 7 = "F7.2" = "DEGREE" = "Elevation step" COLUMN = "CURRENT"</pre>		
DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	<pre>= ASCII_REAL = 210 = 6 = "F6.3" = "MICROAMPERE" = "Sum of currents for ene</pre>	rgy steps 0 to 3	1
END_OBJECT = OBJECT NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	<pre>COLUMN = COLUMN = "OVERFLOW_FLAG" = CHARACTER = 218 = 64 = "N/A" = "N/A" = "String of 64 characters to a step of energy and values : 0 : No overfl 1 : Overflow In low resolution the 3 and set to blank "</pre>	may take one of ow	the following
END_OBJECT	= COLUMN		

4.3.5.4.7 Faraday cup current-energy distribution

FC TABLE object for PAR mode

OBJECT	= ROMAP SPM PAR FC TABLE
NAME	= ROMAP SPM PAR FC
INTERCHANGE_FORMAT	= ASCII
ROWS	= 180
COLUMNS	= 24
ROW BYTES	= 212
^STRUCTURE	= "ROMAP SPM FCC.FMT"
END_OBJECT	= ROMAP_SPM_PAR_FC_TABLE

FC TABLE object for RAW mode

OBJECT	= ROMAP SPM RAW FC TABLE
NAME	= ROMAP SPM RAW FC
INTERCHANGE FORMAT	= ASCII
ROWS	= 34
COLUMNS	= 24
ROW BYTES	= 212
^STRUCTURE	= "ROMAP SPM FCC.FMT"
END OBJECT	= ROMAP SPM RAW FC TABLE
—	

The structure of the TABLE object is described in the file ROMAP_SPM_FCC.FMT as follows:

IGEEP TU Braunschweig	ROMAP EAICD	Document No. Issue/Rev. No. Date Page	RO-ROL-ROMAP-EAICD 1 / 1 14-July-2016 115
OBJECT NAME DATA_TYPE START_BYTE BYTES DESCRIPTION	<pre>= COLUMN = "UTC" = TIME = 1 = 23 = "This column represents</pre>	PDS standard fo	rmat
NAME DATA_TYPE	<pre>= COLUMN = "OBT" = ASCII_REAL = 25 = 15 = SECOND = "F15.5" = "ROMAP 4 bytes counter r. time synchronized with 3</pre>	Lander On Board	
END_OBJECT =	The time resolution is COLUMN	0.03125 s"	
NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	<pre>COLUMN = "MODE" = CHARACTER = 42 = 9 = "N/A" = "N/A" = "SPM mode: raw or parameter" COLUMN</pre>		
NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	<pre>COLUMN = "EXPOSITION_TIME" = CHARACTER = 54 = 5 = "N/A" = "N/A" = "SPM exposition time set short or long"</pre>	ting:	
START_BYTE BYTES FORMAT UNIT DESCRIPTION	<pre>COLUMN = "CALIBRATION" = CHARACTER = 62 = 8 = "N/A" = "N/A" = "SPM calibration status:</pre>		
END_OBJECT =			
NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	<pre>COLUMN = "CEM_SUPPLY" = ASCII_INTEGER = 72 = 1 = "I1" = "N/A" = "SPM CEM supply setting: step number from 1 to 5 COLUMN</pre>	11	

GEP Braunschweig	ROMAP EAICD	Document No. Issue/Rev. No. Date Page	RO-ROL-ROMAP-EAICD 1 / 1 14-July-2016 116
OBJECT = NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	<pre>= COLUMN = "RESOLUTION" = CHARACTER = 75 = 4 = "N/A" = "N/A" = "SPM resolution setting:</pre>		
END_OBJECT =	= COLUMN		
	<pre>= COLUMN = "ION_CHANNEL" = CHARACTER = 82 = 8 = "N/A" = "N/A" = "Ion channel status: Both_off Ion1 Ion2 Path or"</pre>		
END_OBJECT =	Both_on" = COLUMN		
OBJECT = NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	<pre>= COLUMN = "EVEN_ODD" = CHARACTER = 93 = 8 = "N/A" = "N/A" = "Indicates whether all example are transmitted (64 for for 32 for low resolution) or alternatively. Takes the even odd or full"</pre>	ull resolution a even/odd energi	
END_OBJECT =	= COLUMN		
NAME	<pre>= COLUMN = "I1_X_ECLIPJ2000" = ASCII_REAL = 103 = 6 = "F6.3" = "N/A" = "X component of unit vec in ECLIPJ2000 coordinate</pre>		Ion 1 detector
END_OBJECT =	= COLUMN		
NAME DATA_TYPE START_BYTE BYTES FORMAT	<pre>= COLUMN = "I1_Y_ECLIPJ2000" = ASCII_REAL = 110 = 6 = "F6.3" = "N/A" = "Y component of unit vec</pre>		Ion 1 detector
END_OBJECT =	in ECLIPJ2000 coordinat = COLUMN	es"	
NAME	= COLUMN = "I1_Z_ECLIPJ2000" = ASCII_REAL = 117 = 6 = "F6.3"		

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UNIT	= "N/A"		
DESCRIPTION	= "Z component of unit ve in ECLIPJ2000 coordina		Ion 1 detector
	= COLUMN		
	= COLUMN		
NAME	= "I2_X_ECLIPJ2000" = ASCII_REAL		
DATA_TYPE START BYTE	= 124		
BYTES	= 6		
FORMAT	= "F6.3"		
UNIT	= "N/A"		
DESCRIPTION	= "X component of unit ve		Ion 2 detector
END_OBJECT	in ECLIPJ2000 coordina = COLUMN	ites"	
	= COLUMN		
NAME Data type	= "I2_Y_ECLIPJ2000"		
DATA_TYPE START BYTE	= ASCII_REAL = 131		
BYTES	= 6		
FORMAT	= "F6.3"		
UNIT	= "N/A"		
DESCRIPTION	= "Y component of unit ve in ECLIPJ2000 coordina		Ion 2 detector
END OBJECT	= COLUMN	ites"	
-			
OBJECT NAME	= COLUMN = "I2 Z ECLIPJ2000"		
DATA TYPE	= ASCII REAL		
START BYTE	= 138		
BYTES	= 6		
FORMAT	= "F6.3"		
UNIT	= "N/A"		
DESCRIPTION	= "Z component of unit ve in ECLIPJ2000 coordina		lon 2 detector
END_OBJECT	= COLUMN		
OBJECT	= COLUMN		
NAME	= "EL X ECLIPJ2000"		
DATA_TYPE	= ASCII_REAL		
START_BYTE	= 145		
BYTES	= 6 = "F6.3"		
FORMAT UNIT	= ro.s = "N/A"		
DESCRIPTION	= "X component of unit ve	ctor aligned with	electron
END OBJECT	detector in ECLIPJ200 = COLUMN	0 coordinates"	
-			
	= COLUMN		
NAME DATA TYPE	= "EL_Y_ECLIPJ2000" = ASCII REAL		
START BYTE	$= ASCII_REAL$ $= 152$		
BYTES	= 6		
FORMAT	= "F6.3"		
UNIT	= "N/A"		
DESCRIPTION	= "Y component of unit ve detector in ECLIPJ200	-	electron
END_OBJECT	= COLUMN		
OBJECT	= COLUMN		
	= "EL Z ECLIPJ2000"		
DATA_TYPE	= ASCII_REAL		
START_BYTE	= 159		
BYTES	= 6		
FORMAT	= "F6.3"		
UNIT	= "N/A"		

IGEP TU Braunschweig	d ROMAP EAICD	Document No. Issue/Rev. No. Date Page	RO-ROL-ROMAP-EAICD 1 / 1 14-July-2016 118
END_OBJECT	detector in ECLIPJ200 = COLUMN	00 coordinates"	
OBJECT NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION END OBJECT	<pre>= COLUMN = "FC_X_ECLIPJ2000" = ASCII_REAL = 166 = 6 = "F6.3" = "N/A" = "X component of unit ve in ECLIPJ2000 coordinate = COLUMN</pre>	ector aligned with ates"	n Faraday cup
FUD_ORDECI	= COLUMN		
OBJECT NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	<pre>= COLUMN = "FC_Y_ECLIPJ2000" = ASCII_REAL = 173 = 6 = "F6.3" = "N/A" = "Y component of unit venim ECLIPJ2000 coordinations"</pre>		n Faraday cup
END_OBJECT	= COLUMN		
OBJECT NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	<pre>= COLUMN = "FC_Z_ECLIPJ2000" = ASCII_REAL = 180 = 6 = "F6.3" = "N/A" = "Z component of unit ve in ECLIPJ2000 coordination</pre>		n Faraday cup
END_OBJECT	= COLUMN		
/* Add index colur /* Index colu	**************************************		*/ */
OBJECT NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION END_OBJECT	<pre>= COLUMN = "INDEX" = INTEGER = 187 = 5 = "I5" = "N/A" = "Measurement index" = COLUMN</pre>		
/* ***********	****	* * * * * * * * * * * * * * * *	*/
OBJECT NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION END_OBJECT OBJECT NAME DATA TYPE	<pre>= COLUMN = "ENERGY" = ASCII_REAL = 193 = 7 = "F7.2" = "ELECTRONVOLT" = "Energy step" = COLUMN = COLUMN = "CURRENT" = ASCII_REAL 001</pre>		
START_BYTE	= ASCII_REAL = 201		



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FORMAT = "F10.2" UNIT = "NANOAMPERE" DESCRIPTION = "Faraday cup Current ' END_OBJECT = COLUMN	FC UI DI	ORMAT NIT ESCRIPTION	=	"NANOAMPE "Faraday		Current	"
--	----------------	----------------------------	---	-----------------------	--	---------	---

4.3.5.4.8 Electron spectrum (count-energy distribution)

Electron spectrum TABLE object for PAR mode

OBJECT	=	ROMAP SPM PAR ELEC TABLE
NAME	=	ROMAP_SPM_PAR_ELEC
INTERCHANGE FORMAT	=	ASCII
ROWS	=	320
COLUMNS	=	24
ROW_BYTES	=	213
^STRUCTURE	=	"ROMAP SPM ELECC.FMT"
END_OBJECT	=	ROMAP_SPM_PAR_ELEC_TABLE

Electron spectrum TABLE object for RAW mode

OBJECT NAME	<pre>= ROMAP_SPM_RAW_ELEC_TABLE = ROMAP_SPM_RAW_ELEC</pre>
INTERCHANGE FORMAT	= ASCII
ROWS	= 32
COLUMNS	= 24
ROW BYTES	= 210
^STRUCTURE	= "ROMAP SPM ELECC.FMT"
END_OBJECT	= ROMAP_SPM_RAW_ELEC_TABLE

The structure of the TABLE object is described in the file ROMAP_SPM_ELECC.FMT as follows:

```
Contents of format file "ROMAP_SPM_ELECC.FMT"
/*
                                                            */
*/
/*
        Electron spectrum (count-energy distribution) (Level 3)
/* Include the HEADER at the beginning of each measurement
                                                    */
OBJECT
                = COLUMN
                 = "UTC"
  NAME
                 = TIME
   DATA TYPE
   START_BYTE
                 = 1
   BYTES
                = 23
   DESCRIPTION
                = "This column represents the UTC
                   Of the SPM spectrum in PDS standard format
                    YYYY-MM-DDThh:mm:ss.sss"
END OBJECT
                 = COLUMN
OBJECT
               = COLUMN
                = "OBT"
   NAME
                = ASCII REAL
   DATA TYPE
   START BYTE
                = 25
                = 15
   BYTES
   UNIT
                = SECOND
                = "F15.5"
   FORMAT
   DESCRIPTION
                = "ROMAP 4 bytes counter representing the measurement
                   time synchronized with Lander On Board Time.
                   The time resolution is 0.03125 s"
END OBJECT
               = COLUMN
OBJECT
               = COLUMN
```

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NAME	= "MODE"		
DATA_TYPE	= CHARACTER		
START_BYTE BYTES	= 42 = 9		
FORMAT	= 9 = "N/A"		
UNIT	= "N/A"		
DESCRIPTION	= "SPM mode:		
END_OBJECT =	raw or parameter" COLUMN		
	COLUMN		
NAME DATA TYPE	= "EXPOSITION_TIME" = CHARACTER		
START BYTE	= 54		
BYTES	= 5		
FORMAT	= "N/A"		
UNIT	= "N/A"		
DESCRIPTION	<pre>= "SPM exposition time set short or long"</pre>	cting:	
END_OBJECT =	COLUMN		
	COLUMN		
NAME	= "CALIBRATION"		
DATA_TYPE	= CHARACTER		
START_BYTE BYTES	= 62 = 8		
FORMAT	$-\circ$ = "N/A"		
UNIT	= "N/A"		
DESCRIPTION		:	
	active or inactive"		
END_OBJECT =	COLUMN		
OBJECT =	COLUMN		
NAME	= "CEM_SUPPLY"		
	= ASCIT_INTEGER		
START_BYTE BYTES	= 72 = 1		
FORMAT	- 1 = "I1"		
UNIT	= "N/A"		
	= "SPM CEM supply setting:	:	
	step number from 1 to 5	5"	
END_OBJECT =	COLUMN		
OBJECT =	COLUMN		
NAME	= "RESOLUTION"		
OBJECT = NAME DATA_TYPE	= CHARACTER		
START_BYTE BYTES	= 75		
BITES	= 4 $= $ $\mathbb{I}_{NI} / \lambda \mathbb{I}_{}$		
FORMAT UNIT	= N/A = "N/A"		
DESCRIPTION	= "SPM resolution setting:		
	low or high"		
	<pre>= "N/A" = "SPM resolution setting: low or high" COLUMN</pre>		
OBJECT =	COLUMN		
NAME	= "ION_CHANNEL"		
OBJECT = NAME DATA_TYPE START_BYTE	= CHARACTER		
START_BYTE	= 82		
BYTES	= 8 = "N/A"		
FORMAT UNIT	$= N/A$ $= "N/\Delta"$		
	= "Ion channel status:		
	Both off		
	Ion1		
	Ion2		
	Both on"		
END_OBJECT =	COLUMN		

IGEP TU Braunschweig	ROMAP EAICD	Document No. Issue/Rev. No. Date Page	RO-ROL-ROMAP-EAICD 1 / 1 14-July-2016 121
OBJECT NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	<pre>= COLUMN = "EVEN_ODD" = CHARACTER = 93 = 8 = "N/A" = "N/A" = "Indicates whether all e are transmitted (64 for f 32 for low resolution) or alternatively. Takes the even odd or full"</pre>	full resolution a even/odd energi	
END_OBJECT	= COLUMN		
OBJECT NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	<pre>= COLUMN = "I1_X_ECLIPJ2000" = ASCII_REAL = 103 = 6 = "F6.3" = "N/A" = "X component of unit vec in ECLIPJ2000 coordinat</pre>		n Ion 1 detector
END_OBJECT	= COLUMN	Jes "	
OBJECT NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	<pre>= COLUMN = "I1_Y_ECLIPJ2000" = ASCII_REAL = 110 = 6 = "F6.3" = "N/A" = "Y component of unit vec in ECLIPJ2000 coordinat</pre>		n Ion 1 detector
END_OBJECT :	= COLUMN	.es	
NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	<pre>= COLUMN = "I1_Z_ECLIPJ2000" = ASCTI_REAL = 117 = 6 = "F6.3" = "N/A" = "Z component of unit vec in ECLIPJ2000 coordinat</pre>		n Ion 1 detector
END_OBJECT :	= COLUMN		
NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT	<pre>= COLUMN = "I2_X_ECLIPJ2000" = ASCII_REAL = 124 = 6 = "F6.3" = "N/A" = "X component of unit vec in ECLIPJ2000 coordinat</pre>		n Ion 2 detector
END_OBJECT :	= COLUMN		
NAME DATA_TYPE START_BYTE BYTES FORMAT	<pre>= COLUMN = "I2_Y_ECLIPJ2000" = ASCTI_REAL = 131 = 6 = "F6.3" = "N/A" = "Y component of unit vec</pre>	tor aligned with	n Ion 2 detector

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END_OBJECT	in ECLIPJ2000 coordinat = COLUMN	es"	
NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	<pre>= COLUMN = "I2_Z_ECLIPJ2000" = ASCII_REAL = 138 = 6 = "F6.3" = "N/A" = "Z component of unit vec in ECLIPJ2000 coordinat</pre>		Ion 2 detector
END_OBJECT	= COLUMN		
OBJECT NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	<pre>= COLUMN = "EL_X_ECLIPJ2000" = ASCII_REAL = 145 = 6 = "F6.3" = "N/A" = "X component of unit vec detector in ECLIPJ2000</pre>		electron
END_OBJECT	= COLUMN	coordinates	
NAME	= COLUMN = "EL_Y_ECLIPJ2000" = ASCII_REAL = 152 = 6 = "F6.3" = "N/A"		
DESCRIPTION	<pre>= "Y component of unit vect detector in ECLIPJ2000 = COLUMN</pre>		electron
- OBJECT DATA_TYPE START_BYTE BYTES FORMAT UNIT	<pre>= COLUMN = "EL Z_ECLIPJ2000" = ASCTI_REAL = 159 = 6 = "F6.3" = "N/A" = "Z component of unit vec detector in ECLIPJ2000</pre>		electron
END_OBJECT	= COLUMN		
NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT	<pre>= COLUMN = "FC_X_ECLIPJ2000" = ASCII_REAL = 166 = 6 = "F6.3" = "N/A" = "X component of unit vec in ECLIPJ2000 coordinat</pre>		Faraday cup
END_OBJECT	= COLUMN		
NAME DATA_TYPE START_BYTE BYTES	<pre>= COLUMN = "FC_Y_ECLIPJ2000" = ASCTI_REAL = 173 = 6 = "F6.3" = "N/A" = "Y component of unit vec</pre>	tor aligned with	Faraday cup

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END_OBJECT	in ECLIPJ2000 coordina = COLUMN	tes"	
NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	<pre>= COLUMN = "FC_Z_ECLIPJ2000" = ASCII_REAL = 180 = 6 = "F6.3" = "N/A" = "Z component of unit very in ECLIPJ2000 coordinate = COLUMN</pre>		n Faraday cup
/* Add index column /* Index colum	**************************************		*/ */
NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	<pre>= COLUMN = "INDEX" = INTEGER = 187 = 5 = "I5" = "N/A" = "Measurement index" = COLUMN</pre>		
—	****	* * * * * * * * * * * * * * *	*/
OBJECT NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION END_OBJECT	<pre>= COLUMN = "ENERGY" = ASCII_REAL = 193 = 7 = "F7.2" = "ELECTRONVOLT" = "Energy step" = COLUMN</pre>		
OBJECT NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION END_OBJECT	<pre>= COLUMN = "COUNTS" = ASCII_REAL = 201 = 8 = "F8.2" = "CM**-2*S**-1" = "Electron counts" = COLUMN</pre>		

4.3.5.5 Description of Instrument

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

4.3.5.6 Mission Specific Keywords

There is no mission specific keywords for ROMAP.



4.3.6 Housekeeping Calibrated Data Product Design (Level 3)

4.3.6.1 File Characteristics Data Elements

The PDS file characteristic data elements for ROMAP HK calibrated data (level 3) are:

```
RECORD_TYPE = FIXED_LENGTH
RECORD_BYTES = 168
FILE_RECORDS
LABEL_RECORDS
```

4.3.6.2 Data Object Pointers Identification Data Elements

The ROMAP HK calibrated data are organized as ASCII tables. The data object pointers (^TABLE) reference TAB files.

4.3.6.3 Instrument and Detector Descriptive Data Elements

4.3.6.4 Data Object Definition

Each TAB file contains a 18 columns table with the calibrated HK data (ADC units).

OBJECT	=	TABLE
NAME	=	"ROMAP CALHK TABLE"
INTERCHANGE_FORMAT	=	ASCII – –
ROWS	=	
COLUMNS	=	18
ROW_BYTES	=	168
^STRUCTURE	=	"ROMAP_CALHK.FMT"
END_OBJECT	=	TABLE

The structure of the TABLE object is described in the file ROMAP_CALHK.FMT as follows:

/*	Contents of	format file	"ROMAP_CALHK.FMT"	(Calibrated HK data) */
OBJ	ECT NAME DATA_TYPE START_BYTE BYTES DESCRIPTION	Of	" s column represents the HK parameters s	et in PDS standard format
EN	D_OBJECT	= COLU	Y-MM-DDThh:mm:ss.ss MN	s"
OBJ	ECT NAME DATA_TYPE START_BYTE BYTES UNIT FORMAT DESCRIPTION	= 25 = 15 = SECON = "F15. = "ROMA	_REAL D 5" P 4 bytes counter r	epresenting the measurement Lander On Board Time.

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END_OBJECT	The = COLUM	time resolution i N	s 0.03125 s"	
OBJECT NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	= CHARA = 42 = 4 = "Hexa = "N/A"	ROLLER STATUS"	ts :	
	Bit		Description	
	0	Status flag : I	nstrument Mode was	loaded
	1	a Status flag : M	t power-up from TC AG setting was loa C-Buffer	C-Buffer
	3 4	Error flag : re	ad TC-Buffer error ite BRAM error; cl	
	5	Error flag : TC	uccessfully writin -Buffer content er	
	6	Error flag : SPI (c	llegal checksum) M Ion 1 counter ov leared after displ verflow error flag	aying SPM
	7	Error flag : SPI (c	M Ion 2 counter ov leared after displ verflow errorflag	verflow occurred aying SPM
	8	Error flag : SP oc	M Electron counter curred (cleared af M overflow error f	r overflow Tter displaying
	9 10 11 1213 1415	Status flag : P Status flag : P Status flag : D Not used	enning pressure se irani pressure sen UMMY FPGA output c 0, I1 identify ins	ensor on/off asor on/off on/off
END OBJECT		l the instrument	5 is set once, is switched off."	it stays active
—			D 1)"	
DATA_TYPE START_BYTE BYTES	= CHARA = 49 = 4	CTER		
OBJECT NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION END_OBJECT	= "N/A" = "N/A" = "Last = COLUM	received TC (wor	d 1)in Hexadecimal	. Format"
OBJECT NAME	= COLUM = "LAST	N RECEIVED TC (WOR	D 2)"	
OBJECT NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION END_OBJECT	= CHARA $= 56$ $= 4$ $= "N/A"$	CTER		
DESCRIPTION END_OBJECT	= "N/A" = "Last = COLUM	received TC (wor N	d 2) in Hexadecim	nal Format"
OBJECT NAME DATA_TYPE START_BYTE BYTES	= COLUM = "POWE = ASCII = 62			

TU	GEP Braunschweig	ROMAP EAICD	Document No. Issue/Rev. No. Date Page	RO-ROL-ROMAP-EAICD 1 / 1 14-July-2016 126
	FORMAT	= "F8.2"		
	UNIT	= MILLIWATT		
	DESCRIPTION	<pre>= "Overall instrument powe</pre>		
	END_OBJECT	= COLUMN	1	
	OBJECT	= COLUMN		
	NAME	= "+5V CURRENT"		
		= ASCII_REAL		
	START_BYTE BYTES	= 71 = 7		
	FORMAT	= "F7.2"		
	UNIT	= VOLT		
	DESCRIPTION	= "+5V current		
	END_OBJECT	I = N * 76.3E-3 * 0.5 [: = COLUMN	mA]"	
	- OBJECT	= COLUMN		
	NAME	= "-5V CURRENT"		
		= ASCII_REAL		
	START_BYTE	= 79		
	BYTES FORMAT	= 7 = "F7.2"		
	UNIT	= VOLT		
	DESCRIPTION	= "-5V current		
	END_OBJECT	I = N * 76.3E-3 * 0.05 = COLUMN	[mA]"	
	OBJECT	= COLUMN		
	NAME	= "ELECTRONICS TEMPERATURE	"	
	DATA_TYPE	= ASCII_REAL = 87		
	START_BYTE BYTES	= 6		
	FORMAT	= "F6.2"		
	UNIT	= KELVIN		
	DESCRIPTION	= "electronics temperature T = (N * 76.3E-6 - 0.53)		
	END_OBJECT	= COLUMN	5) 472.5 [C]	
	OBJECT	= COLUMN		
	NAME	= "+28V CURRENT"		
	DATA_TYPE START BYTE	= ASCII_REAL = 94		
	BYTES	= 7		
		= "F7.2"		
	UNIT DESCRIPTION	= MILLIAMPERE = "+28V current		
	DESCRIPTION	I = N * 76.3E-3 * 0.025	[mA]"	
	END_OBJECT	= COLUMN		
		= COLUMN		
	NAME	= "SPM HV STATUS 1"		
	DATA_TYPE START_BYTE	= ASCII_REAL = 102		
	BYTES	= 5		
	FORMAT	= "F5.2"		
		= VOLT = "SPM HV status 1"		
	END_OBJECT	= COLUMN		
	OBJECT	= COLUMN		
	NAME	= "SPM HV STATUS 2"		
	DATA_TYPE	= ASCII_REAL		
		= 108 = 8		
		= "F8.4"		
	UNIT	= VOLT		

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DESCRIPTION END_OBJECT	= "SPM HV status 2" = COLUMN		
START_BYTE BYTES FORMAT UNIT	<pre>= COLUMN = "SPM HV STATUS 3" = ASCII_REAL = 117 = 8 = "F8.4" = VOLT = "SPM HV status 3" = COLUMN</pre>		
BYTES FORMAT UNIT	<pre>= COLUMN = "SPM HV STATUS 4" = ASCII_REAL = 126 = 8 = "F8.4" = VOLT = "SPM HV status 4" = COLUMN</pre>		
BYTES FORMAT	<pre>= COLUMN = "PENNING PRESSURE" = ASCII_INTEGER = 135 = 7 = "I7" = PASCAL = "Penning pressure" = COLUMN</pre>		
OBJECT NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION END OBJECT	<pre>= COLUMN = "PIRANI PRESSURE" = ASCII_INTEGER = 143 = 7 = "I7" = PASCAL = "Pirani pressure" = COLUMN</pre>		
- OBJECT DATA_TYPE START_BYTE BYTES FORMAT	= COLUMN = "PROM CHECKSUM" = CHARACTER	l at power-up)	
DATA_TYPE START_BYTE BYTES FORMAT	<pre>= 159 = 4 = "N/A" = "N/A" = " Instrument Error Flags</pre>	; in Hexadecimal	Format :
	Bit Descript O Command overflow		

IGEP Institut für Geophysik und EV Braunschweig	Romar	P EAICD	Document No. Issue/Rev. No. Date Page	RO-ROL-ROMAP-EAICD 1 / 1 14-July-2016 128
END_OBJECT	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 = COLUMN	CDMS illegal word CDMS message error General CDMS rece: General CDMS trans Wrong telecommand CDMS request over: befor Frame buffer over: MAG vector samplin CDMS error code wd CDMS checksum error checksum error in SPM counter overf SPM transmission of SPM setup error"	r iving error smission error received flow (a CDMS req the former was flow ng overflow ord received or received CDMS St low flow	s processed)

4.3.7 Magnetometer Science calibrated Data Product Design (Level 5)

There are two kinds of calibrated science data for the ROMAP MAG instrument, draft calibrated and final calibrated. The level 5 contains final calibrated data. The calibration includes removal of spacecraft influence, of all kinds of AC disturbances and taking into account of temperature dependency of magnets. Only those data are suitable for scientific interpretation. Both data products (draft calibrated and calibrated) have the same format, i.e. the UTC, the OBT, the spacecraft position (X, Y, Z) and the magnetic field (Bx, By, Bz) in Instrument, Lander, Orbiter and ECLIP J2000 coordinates.

4.3.7.1 File Characteristics Data Elements

The PDS file characteristic data elements for ROMAP MAG science calibrated data are:

```
RECORD_TYPE = FIXED_LENGTH
RECORD_BYTES = 119
FILE RECORDS
LABEL RECORDS
```

4.3.7.2 Data Object Pointers Identification Data Elements

The ROMAP MAG SC calibrated data are organized as ASCII tables. The data object pointers (^TABLE) reference TAB files.

4.3.7.3 Instrument and Detector Descriptive Data Elements

The following data identification elements provide additional information about the ROMAP-MAG data products.

INSTRUMENT_HOST_NAME INSTRUMENT_HOST_ID INSTRUMENT_ID INSTRUMENT_NAME INSTRUMENT_TYPE	<pre>= "ROSETTA-LANDER" = RL = ROMAP = "ROSETTA LANDER MAGNETOMETER AND PLASMA MONITOR" = {"FLUXGATE MAGNETOMETER", "ELECTROSTATIC ANALYZER"</pre>	,
DETECTOR_ID INSTRUMENT_MODE_ID INSTRUMENT_MODE_DESC	= MAG = "N/A" = "N/A"	

4.3.7.4 Data Object Definition

4.3.7.4.1 Level E data object definition (calibrated in instrument coordinates)



Each TAB file contains an eight columns table with the magnetic field and the spacecraft position.

OBJECT NAME INTERCHANGE_FORMAT	=	TABLE "ROMAP_MAG_CALSCE_TABLE" ASCII
ROWS	=	
COLUMNS	=	8
ROW BYTES	=	119
^STRUCTURE	=	"ROMAP MAG CALSCE.FMT"
END_OBJECT	=	TABLE

The structure of the TABLE object is described in the file ROMAP_MAG_CALSCE.FMT as follows:

Contents of format file "ROMAP_MAG_CALSCE.FMT" /* */ /* Level E data object definition : */ /* */ calibrated in instrument coordinates OBJECT = COLUMN = "UTC" NAME = TIME DATA TYPE START_BYTE = 1 BYTES = 23 = "This column represents the UTC DESCRIPTION Of the magnetic field vector in PDS standard format YYYY-MM-DDThh:mm:ss.sss" END OBJECT = COLUMN OBJECT = COLUMN = "OBT" NAME DATA TYPE = ASCII_REAL START BYTE = 25 BYTES = 15 = SECOND UNTT = "F15.5" FORMAT = "ROMAP 4 bytes counter representing the measurement DESCRIPTION time synchronized with Lander On Board Time. The time resolution is 0.03125 s" END OBJECT = COLUMN OBJECT = COLUMN = "POS X" NAME = ASCII_REAL DATA TYPE START BYTE = 41 = 16 BYTES = "F16.3" FORMAT UNIT = KILOMETER = "X component of the Spacecraft (Lander) position, DESCRIPTION ECLIPJ2000 coordinates" END OBJECT = COLUMN OBJECT = COLUMN = "POS Y" NAME = ASCII REAL DATA TYPE START_BYTE = 58 BYTES = 16 = "F16.3" FORMAT UNIT = KILOMETER DESCRIPTION = "Y component of the Spacecraft (Lander) position, ECLIPJ2000 coordinates" END OBJECT = COLUMN OBJECT = COLUMN = "POS_Z" NAME DATA TYPE = ASCII REAL START BYTE = 75 BYTES = 16

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FORMAT UNIT	= "F16.3" = KILOMETER		
DESCRIPTION	= "Z component of the Spa ECLIPJ2000 coordinates		position,
END_OBJECT	= COLUMN	•	
OBJECT	= COLUMN		
NAME	= "BX"		
DATA TYPE	= ASCII REAL		
START BYTE	= 92		
BYTES	= 8		
FORMAT	= "F8.2"		
UNIT	= NANOTESLA		
DESCRIPTION	<pre>= "Magnetic field X compo calibrated, instrument</pre>		
END_OBJECT	= COLUMN		
OBJECT	= COLUMN		
NAME	= "BY"		
DATA TYPE	= ASCII REAL		
START BYTE	= 101 -		
BYTES	= 8		
FORMAT	= "F8.2"		
UNIT	= NANOTESLA		
DESCRIPTION	= "Magnetic field Y compo	onent,	
	calibrated, instrument	coordinates"	
END_OBJECT	= COLUMN		
OBJECT	= COLUMN		
NAME	= "BZ"		
DATA TYPE	= ASCII REAL		
START BYTE	= 110		
BYTES	= 8		
FORMAT	= "F8.2"		
UNIT	= NANOTESLA		
DESCRIPTION	= "Magnetic field Z compo		
	calibrated, instrument	coordinates"	
END_OBJECT	= COLUMN		

4.3.7.4.2 Level F data object definition (calibrated in Lander coordinates)

Each TAB file contains an eight columns table with the magnetic field and the spacecraft position.

OBJECT	=	TABLE
NAME	=	"ROMAP MAG CALSCF TABLE"
INTERCHANGE_FORMAT	=	ASCII
ROWS	=	
COLUMNS	=	8
ROW BYTES	=	119
^STRUCTURE	=	"ROMAP MAG CALSCF.FMT"
END_OBJECT	=	TABLE

The structure of the TABLE object is described in the file ROMAP_MAG_CALSCF.FMT as follows:

```
/* Contents of format file "ROMAP_MAG_CALSCF.FMT" */
/* Level F data object definition : */
/* calibrated in Lander coordinates */
```

OBJECT	= COLUMN
NAME	= "UTC"
DATA TYPE	= TIME
START_BYTE	= 1
BYTES	= 23
DESCRIPTION	= "This column represents the UTC
	Of the magnetic field vector in PDS standard format

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END OBJECT	YYYY-MM-DDThh:mm:ss.ss = COLUMN	ss"	
	0011301		
OBJECT NAME	= COLUMN = "OBT"		
DATA_TYPE	= ASCII REAL		
START BYTE	= 25		
BYTES	= 15		
UNIT	= SECOND		
FORMAT	= "F15.5"		
DESCRIPTION	<pre>= "ROMAP 4 bytes counter r time synchronized with The time resolution is</pre>	Lander On Board	
END_OBJECT	= COLUMN		
OBJECT	= COLUMN		
NAME	= "POS X"		
DATA_TYPE	= ASCII_REAL		
START_BYTE	= 41		
BYTES	= 16		
FORMAT UNIT	= "F16.3"		
DESCRIPTION	<pre>= KILOMETER = "X component of the Spac ECLIPJ2000 coordinates'</pre>		position,
END_OBJECT	= COLUMN		
OBJECT	= COLUMN		
NAME	= "POS Y"		
DATA_TYPE	= ASCII_REAL		
START_BYTE	= 58		
BYTES	= 16		
FORMAT UNIT	= "F16.3" = KILOMETER		
DESCRIPTION	= "Y component of the Space ECLIPJ2000 coordinates"		position,
END_OBJECT	= COLUMN		
OBJECT	= COLUMN		
NAME	= "POS Z"		
DATA TYPE	= ASCII_REAL		
START_BYTE	= 75		
BYTES	= 16		
	= "F16.3"		
UNIT DESCRIPTION	<pre>= KILOMETER = "Z component of the Spac ECLIPJ2000 coordinates'</pre>		position,
END_OBJECT	= COLUMN		
OBJECT	= COLUMN		
NAME	= "BX"		
DATA_TYPE	= ASCII_REAL = 92		
BYTES FORMAT	= 8 = "F8.2"		
UNIT	= NANOTESLA		
	= "Magnetic field X compor calibrated, Lander coor		
END_OBJECT	= COLUMN		
OBJECT	= COLUMN		
NAME	= "BY"		
DATA TYPE	= ASCII_REAL		
START_BYTE BYTES	= 101 = 8		
FORMAT	= 8 = "F8.2"		
T () T (T T T T			
UNIT	= NANOTESLA		

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end_object	calibrated, Lander coord = COLUMN	linates"	
OBJECT NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	<pre>= COLUMN = "BZ" = ASCII_REAL = 110 = 8 = "F8.2" = NANOTESLA = "Magnetic field Z comportion calibrated, Lander coord</pre>		
END_OBJECT	= COLUMN		

4.3.7.4.3 Level G data object definition (calibrated in Orbiter coordinates) Each TAB file contains an eight columns table with the magnetic field and the spacecraft position.

OBJECT = TABLE	
NAME = "ROMAP MAG CALSCG TABLE"	"
INTERCHANGE_FORMAT = ASCII	
ROWS =	
COLUMNS = 8	
ROW_BYTES = 119	
^STRUCTURE = "ROMAP MAG CALSCG.FMT"	
END_OBJECT = TABLE	

The structure of the TABLE object is described in the file ROMAP_MAG_CALSCG.FMT as follows:

/* Level F dat	<pre>contents of format file "ROMAP_MAG_CALSCG.FMT" */ a object definition : */ in Orbiter coordinates */</pre>
OBJECT NAME DATA_TYPE START_BYTE BYTES DESCRIPTION	= 1
END_OBJECT	= COLUMN
OBJECT NAME DATA_TYPE START_BYTE BYTES UNIT FORMAT DESCRIPTION END_OBJECT	= 15 = SECOND = "F15.5"
OBJECT NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION END_OBJECT	= "F16.3" = KILOMETER

OBJECT = COLUMN NAME = "FOS Y" DATA TYPE = ASCIT_REAL START DYTE = 36 BC START DYTE = 37 OCHANA = "I6.3" UNIT = KILOMPTER DESCRIPTION = "Y component of the Spacecraft (Lander) position, ECLIPJ2000 coordinates" END_OBJECT = COLUMN NAME = "POS S" DATA TYPE = ASCIT_REAL START DYTE = 15 FORMAT = "F16.3" UNIT = "TLOMPTER DESCRIPTION = "Component of the Spacecraft (Lander) position, ECLIPJ2000 coordinates" END_OBJECT = COLUMN NAME = "POS S." DATA TYPE = ASCIT_REAL START DYTE = 0 DESCRIPTION = "Component of the Spacecraft (Lander) position, ECLIPJ2000 coordinates" END_OBJECT = COLUMN NAME = "PEX" DATA TYPE = ASCIT_REAL START DYTE = 92 BTSS = "PS.2" UNIT = UNNOTESIA DESCRIPTION = "Agentic field X component, calibrated, Orbiter coordinates" END_OBJECT = COLUMN NAME = "PY" DATA TYPE = ASCIT_REAL START DYTE = 101 BYTES = 101 BYTES = 8 FORMAT = "S1.2" UNIT = NANOTESIA DESCRIPTION = "Wagnetic field X component, calibrated, Orbiter coordinates" END_OBJECT = COLUMN NAME = "PY" DATA TYPE = ASCIT_REAL START DYTE = 101 BYTES = 8 FORMAT = "S1.2" UNIT = NANOTESIA DESCRIPTION = "Agentic field Y component, calibrated, Orbiter coordinates" END_OBJECT = COLUMN NAME = "PY" DATA TYPE = ASCIT_REAL START DYTE = 101 BYTES = 8 FORMAT = "S1.2" UNIT = NANOTESIA DESCRIPTION = "Wagnetic field Y component, calibrated, Orbiter coordinates" END_OBJECT = COLUMN NAME = "PY" DATA TYPE = ASCIT_REAL START DYTE = 101 BYTES = 8 FORMAT = "S1.2" UNIT = NANOTESIA DESCRIPTION = "Wagnetic field Z component, calibrated, Orbiter coordinates" END_OBJECT = COLUMN NAME = "PY" DATA TYPE = ASCIT_REAL START DYTE = 110 BYTES = 8 FORMAT = "S1.2" DATA TYPE = ASCIT_REAL START DYTE = 110 BYTES = 8 FORMAT = "S1.2" DATA TYPE = ASCIT_REAL START DYTE = 110 BYTES = 8 FORMAT = "S1.2" DATA TYPE = ASCIT_REAL START DYTE = 110 BYTES = 8 FORMAT = "S1.2" DATA TYPE = ASCIT_REAL START DYTE = 110 BYTES = 8 FORMAT = "S1.2" END_OBJECT = COLUMN	је ти ві	Institut für Geophysik und extraterrestrische Physik	ROMAP EAICD	Document No. Issue/Rev. No. Date Page	RO-ROL-ROMAP-EAICD 1 / 1 14-July-2016 133
DATA TYPE = ASCIT_REAL START_BYTE = 58 BYTES = 16 FORMAT = "F16.3" UNIT = KILCMETER DESCRIPTION = "Y component of the Spacecraft (Lander) position, ECLIPUZ000 coordinates" END_OBJECT = COLUMN NAME = "POS 2" DATA TYPE = ASCIT_REAL START_BYTE = 75 BYTES = 16 FORMAT = "F16.3" UNIT = KILCMETER DESCRIPTION = "Z component of the Spacecraft (Lander) position, ECLIPUZ000 coordinates" END_OBJECT = COLUMN NAME = "BX" DATA TYPE = ASCIT_REAL START_BYTE = 75 BYTES = 16 PORMAT = "F16.3" UNIT = KILCMETER DESCRIPTION = "Z component of the Spacecraft (Lander) position, ECLIPUZ000 coordinates" END_OBJECT = COLUMN OBJECT = COLUMN NAME = "BZ" UNIT = NANOTESIA DESCRIPTION = "Magnetic field Y component, calibrated, Orbiter coordinates" END_OBJECT = COLUMN NAME = "BZ" DATA TYPE = ASCIT_REAL START_BYTE = 110 BYTES = 8 FORMAT = "F8.2" UNIT = NANOTESIA DESCRIPTION = "Magnetic field Y component, calibrated, Orbiter coordinates" END_OBJECT = COLUMN NAME = "BZ" DATA TYPE = ASCIT_REAL START_BYTE = 110 BYTES = 8 FORMAT = "F8.2" UNIT = NANOTESIA DESCRIPTION = "Magnetic field Y component, calibrated, Orbiter coordinates" END_OBJECT = COLUMN NAME = "BZ" DATA TYPE = ASCIT_REAL START_BYTE = 110 BYTES = 8 FORMAT = "F8.2" UNIT = NANOTESIA DESCRIPTION = "Magnetic field Y component, calibrated, Orbiter coordinates" END_OBJECT = COLUMN					
<pre>START_BYTE = 58 - BYTES = 16 PORMAT = "F16.3" UNIT = KILOWETER DESCRIPTION = "Y component of the Spacecraft (Lander) position, ECLIPJ2000 coordinates" END_OBJECT = COLUMN NAME = "POS Z" DATA_TYPE = ASCIT_REAL START_BYTE = 75 BYTES = 16 FORMAT = "F16.3" UNIT = KILOWETER DESCRIPTION = "I.COMPONENT of the Spacecraft (Lander) position, ECLIPJ2000 coordinates" END_OBJECT = COLUMN NAME = "BX" DATA_TYPE = ASCIT_REAL START_BYTE = 72 END_OBJECT = COLUMN NAME = "BX" DATA_TYPE = ASCIT_REAL START_BYTE = 92 BYTES = 8 FORMAT = "F8." UNIT = NANOTESIA DESCRIPTION = "SX" DATA_TYPE = ASCIT_REAL START_BYTE = 101 DESCRIPTION = "SY" DATA_TYPE = ASCIT_REAL START_BYTE = 101 DESCRIPTION = "ASCIT_REAL START_BYTE = 101 DESCRIPTION = "AGCIT_REAL START_BYTE = 101 DESCRIPTION = "F8.2" UNIT = COLUMN OBJECT = COLUMN NAME = "BY" DATA_TYPE = ASCIT_REAL START_BYTE = 101 BYTES = 8 FORMAT = "F8.2" UNIT = COLUMN OBJECT = COLUMN OBJECT = COLUMN OBJECT = COLUMN NAME = "BY" DATA_TYPE = ASCIT_REAL START_BYTE = 101 BYTES = 8 FORMAT = "F8.2" UNIT = NANOTESIA DESCRIPTION = "Magnetic field Y component, calibrated, Orbiter coordinates" END_OBJECT = COLUMN NAME = "BZ" UNIT = NANOTESIA DESCRIPTION = "Magnetic field Y component, calibrated, Orbiter coordinates" END_OBJECT = COLUMN NAME = "BZ" UNIT = NANOTESIA DESCRIPTION = "Real START_BYTE = 110 BYTES = 8 FORMAT = "F8.2" UNIT = NANOTESIA DESCRIPTION = "Magnetic field X component, calibrated, Orbiter coordinates" END_OBJECT = COLUMN NAME = "BZ" DATA_TYPE = ASCIT_REAL START_BYTE = 110 BYTES = 8 FORMAT = "F8.2" UNIT = NANOTESIA DESCRIPTION = "Magnetic field X component, calibrated, Orbiter coordinates" END_OBJECT = COLUMN NAME = "BZ" DATA_TYPE = ASCIT_REAL START_BYTE = 110 BYTES = 8 FORMAT = "F8.2" UNIT = NANOTESIA DESCRIPTION = "Magnetic field X component, calibrated, Orbiter coordinates" END_OBJECT = COLUMN NAME = "BZ" DATA_TYPE = ASCIT_REAL START_BYTE = 110 BYTES = 8 FORMAT = "F8.2" UNIT = NANOTESIA DESCRIPTION = "Magnetic field X component, calibrated, Orbiter coordinates" DESCRIPTION = START BYTES = 8</pre>					
<pre>BYTES⁻ = 16 FORMAT = "F16.3" UNIT = KILOMETER DESCRIPTION = Vicomponent of the Spacecraft (Lander) position, ECLIPUZ000 coordinates" END_OBJECT = COLUMN NAME = "POS 2" DATA TYPE = ASCIT REAL START BYTE = 75 BYTES⁻ = 16 FORMAT = "F16.3" UNIT = KILOMETER DESCRIPTION = Vicomponent of the Spacecraft (Lander) position, ECLIPUZ000 coordinates" END_OBJECT = COLUMN NAME = "BX" DATA TYPE = ASCIT REAL START BYTE = 92 BYTES⁻ = 8 FORMAT = "F16.2" UNIT = KILOMETER DESCRIPTION = "EX." DATA TYPE = ASCIT REAL START BYTE = 92 BYTES⁻ = 8 FORMAT = "F8.2" UNIT = NANOTESIA DESCRIPTION = "BY" DATA TYPE = ASCIT REAL START BYTE = 101 BYTES = 8 FORMAT = "F8.2" UNIT = NANOTESIA DESCRIPTION = "BY" DATA TYPE = ASCIT REAL START BYTE = 101 BYTES = 8 FORMAT = "F8.2" UNIT = NANOTESIA DESCRIPTION = "BY" DATA TYPE = ASCIT REAL START BYTE = 101 BYTES = 8 FORMAT = "F8.2" UNIT = NANOTESIA DESCRIPTION = "ASCIT REAL START BYTE = 101 BYTES = 8 FORMAT = "F8.2" UNIT = NANOTESIA DESCRIPTION = "ASCIT REAL START BYTE = 101 BYTES = 8 FORMAT = "F8.2" UNIT = COLUMN NAME = "BZ" DATA TYPE = ASCIT REAL START BYTE = 110 BYTES = 8 FORMAT = "F8.2" UNIT = NANOTESIA DESCRIPTION = "Magnetic field Y component, Calibrated, Orbiter coordinates" END_OBJECT = COLUMN NAME = "BZ" DATA TYPE = ASCIT_REAL START_BYTE = 110 BYTES = 8 FORMAT = "F8.2" UNIT = NANOTESIA DESCRIPTION = "Magnetic field Y component, Calibrated, Orbiter coordinates" END_OBJECT = COLUMN NAME = "BZ" DATA TYPE = ASCIT_REAL START_BYTE = 110 BYTES = 8 FORMAT = "F8.2" UNIT = NANOTESIA DESCRIPTION = "Magnetic field Y component, Calibrated, Orbiter coordinates" END_OBJECT = COLUMN NAME = "BZ" DATA TYPE = ASCIT_REAL START_BYTE = 110 BYTES = 8 FORMAT = "F8.2" UNIT = NANOTESIA DESCRIPTION = "Magnetic field Y component, Calibrated, Orbiter coordinates" END_OBJECT = COLUMN NAME = "BZ" END_OBJECT = COLUMN NAME = "BZ"</pre>			—		
UNIT = KILOMETER DESCRIPTION = "Y component of the Spacecraft (Lander) position, ECLIPY2000 coordinates" END_OBJECT = COLUMN NAME = "POS_2" DATA_TYPE = ASCIT_REAL START BYTE = 75 BYTES = 16 FORMAT = "F16.3" UNIT = KILOMETER DESCRIPTION = "Z. component of the Spacecraft (Lander) position, ECLIPY2000 coordinates" END_OBJECT = COLUMN NAME = "BX" DATA_TYPE = ASCIT_REAL START BYTE = 92 BYTES = 8 FORMAT = "F8.2" UNIT = WAS" DATA_TYPE = ASCIT_REAL START BYTE = 92 BYTES = 8 FORMAT = "F8.2" UNIT = NANOTESLA DESCRIPTION = "AscII_REAL START_BYTE = 101 BYTES = 8 FORMAT = "F8.2" UNIT = NANOTESLA DESCRIPTION = "Magnetic field Y component, calibrated, Orbiter coordinates" END_OBJECT = COLUMN NAME = "BY" DATA_TYPE = ASCII_REAL START_BYTE = 101 BYTES = 8 FORMAT = "F8.2" UNIT = NANOTESLA DESCRIPTION = "Magnetic field Y component, calibrated, Orbiter coordinates" END_OBJECT = COLUMN NAME = "BY" DATA_TYPE = ASCII_REAL START_BYTE = 101 BYTES = 8 FORMAT = "F8.2" UNIT = NANOTESLA DESCRIPTION = "Magnetic field Y component, calibrated, Orbiter coordinates" END_OBJECT = COLUMN NAME = "BY" DATA_TYPE = ASCII_REAL START_BYTE = 101 BYTES = 8 FORMAT = "F8.2" UNIT = NANOTESLA DESCRIPTION = "Magnetic field Z component, calibrated, Orbiter coordinates" END_OBJECT = COLUMN NAME = "BZ" DATA_TYPE = ASCII_REAL START_BYTE = 110 BYTES = 8 FORMAT = "F8.2" UNIT = NANOTESLA DESCRIPTION = "Magnetic field Z component, calibrated, Orbiter coordinates"					
DESCRIPTION = "Y component of the Spacecraft (Lander) position, END_OBJECT = COLUMN OBJECT = COLUMN NAME = "POS 2" DATA TYPE = ASCII_REAL START BYTE = 75 BYTES = 16 FORMAT = "F16.3" UNIT = KILOMETER DESCRIPTION = "Z component of the Spacecraft (Lander) position, ECLEPJ2000 coordinates" END_OBJECT = COLUMN OBJECT = COLUMN OBJECT = COLUMN OBJECT = COLUMN OBJECT = COLUMN OBJECT = COLUMN NAME = "BX" DATA TYPE = ASCII_REAL START BYTE = 92 BYTES = 8 FORMAT = "F6.2" UNIT = NANCTESLA DESCRIPTION = "COLUMN OBJECT = COLUMN OBJECT = COLUMN NAME = "BY" DATA TYPE = ASCII_REAL START BYTE = 101 BYTES = 8 FORMAT = "F8.2" UNIT = NANCTESLA DESCRIPTION = "Magnetic field X component, calibrated, Orbiter coordinates" END_OBJECT = COLUMN NAME = "BY" DATA TYPE = ASCII_REAL START BYTE = 101 BYTES = 8 FORMAT = "F8.2" UNIT = NANCTESLA DESCRIPTION = "Magnetic field Y component, calibrated, Orbiter coordinates" END_OBJECT = COLUMN NAME = "BS" DATA TYPE = ASCII_REAL START BYTE = 101 BYTES = 8 FORMAT = "F8.2" UNIT = NANCTESLA DESCRIPTION = "Magnetic field Y component, calibrated, Orbiter coordinates" END_OBJECT = COLUMN NAME = "BS" DATA TYPE = ASCII_REAL START BYTE = 101 BYTES = 8 FORMAT = "F8.2" UNIT = NANCTESLA DESCRIPTION = "Magnetic field Y component, calibrated, Orbiter coordinates" END_OBJECT = COLUMN NAME = "BS" DATA TYPE = ASCII_REAL START BYTE = 101 BYTES = 8 FORMAT = "F8.2" UNIT = NANCTESLA DESCRIPTION = "Magnetic field Z component, calibrated, Orbiter coordinates"		FORMAT	= "F16.3"		
ECLIPJ2000 coordinates" END_ORJECT = COLUMN OBJECT = COLUMN NAME = "POS Z" DATA TYPE = ASCII FRAL START BYTE = 75 BYTES = 16 PORNAT = "F16.3" UNIT = KILOMETER DESCRIPTION = "Z component of the Spacecraft (Lander) position, ECLIPJ2000 coordinates" END_OBJECT = COLUMN NAME = "SX" DATA TYPE = ASCII FRAL START BYTE = 92 BYTES = 8 FORMAT = "F1.2" UNIT = NANOTESLA DESCRIPTION = "ACCII REAL START BYTE = 101 BYTES = 8 FORMAT = "F1.2" UNIT = NANOTESLA DESCRIPTION = "BY" DATA TYPE = ASCII REAL START BYTE = 101 BYTES = 8 FORMAT = "F1.2" UNIT = NANOTESLA DESCRIPTION = "Magnetic field Y component, calibrated, Orbiter coordinates" END_OBJECT = COLUMN NAME = "BY" DATA TYPE = ASCII REAL START BYTE = 101 BYTES = 8 FORMAT = "F1.2" UNIT = NANOTESLA DESCRIPTION = "Magnetic field Y component, calibrated, Orbiter coordinates" END_OBJECT = COLUMN NAME = "BY" DATA TYPE = ASCII REAL START BYTE = 101 BYTES = 8 FORMAT = "F1.2" UNIT = NANOTESLA DESCRIPTION = "Magnetic field Y component, calibrated, Orbiter coordinates" END_OBJECT = COLUMN NAME = "BZ" DATA TYPE = ASCII REAL START BYTE = 10 BYTES = 8 FORMAT = "F1.2" UNIT = NANOTESLA DESCRIPTION = "Magnetic field Z component, calibrated, Orbiter coordinates"					
END_OBJECT = COLUMN OBJECT = COLUMN NAME = "POS 2" DATA_TYPE = ASCII_REAL START_BYTE = 75 ETTSS = 16 FORMAT = "F16.3" UNIT = KILOMETER DESCRIPTION = "2 component of the Spacecraft (Lander) position, ECLIPJ2000 coordinates" END_OBJECT = COLUMN OBJECT = COLUMN OBJECT = COLUMN OBJECT = COLUMN NAME = "BX" DATA_TYPE = ASCII_REAL START_BYTE = 92 ETTSS = 8 FORMAT = "F6.2" UNIT = NANOTSSLA DESCRIPTION = "Magnetic field X component, calibrated, Orbiter coordinates" END_OBJECT = COLUMN OBJECT = COLUMN NAME = "B2" DATA_TYPE = ASCII_REAL START_BYTE = 110 END_OBJECT = COLUMN		DESCRIPTION			position,
NAME = "POS_Z" DATA TYPE = ASCII_REAL START_BYTE = 75 BTTES = 16 FORMAT = "F16.3" UNIT = KLLOMETER DESCRIPTION = "Z component of the Spacecraft (Lander) position, ECLIPJ2000 coordinates" END_OBJECT = COLUMN OBJECT = COLUMN NAME = "EX" DATA TYPE = ASCII_REAL START_BYTE = 92 BTTES = 8 FORMAT = "F5.2" UNIT = NANOTESLA DESCRIPTION = "Magnetic field X component, calibrated, Orbiter coordinates" END_OBJECT = COLUMN NAME = "EY" DATA TYPE = ASCII_REAL START_BYTE = 101 BTTES = 8 FORMAT = "F6.2" UNIT = COLUMN OBJECT = COLUMN OBJECT = COLUMN NAME = "EY" DATA TYPE = ASCII_REAL START_BYTE = 101 BTTES = 8 FORMAT = "F6.2" UNIT = NANOTESLA DESCRIPTION = "Magnetic field Y component, calibrated, Orbiter coordinates" END_OBJECT = COLUMN NAME = "F7." DATA TYPE = ASCII_REAL START_BYTE = 101 BTTES = 8 FORMAT = "F6.2" UNIT = NANOTESLA NAME = "SZ" DATA TYPE = ASCII_REAL START_BYTE = 100 BJTES = 8 FORMAT = "F6.2" UNIT = NANOTESLA DESCRIPTION = "Magnetic field Y component, calibrated, Orbiter coordinates" END_OBJECT = COLUMN NAME = "SZ" DATA TYPE = ASCII_REAL START_BYTE = 110 BJTES = 8 FORMAT = "F6.2" UNIT = NANOTESLA DESCRIPTION = "Magnetic field Z component, calibrated, Orbiter coordinates"		END_OBJECT			
DATA TYPE = ASCIT_REAL START_BYTE = 75 BTTES = 16 FORMAT = "T16.3" UNIT = KILOMETER DESCRIPTION = "Z component of the Spacecraft (Lander) position, ECLIPJ2000 coordinates" END_OBJECT = COLUMN NAME = "BX" DATA TYPE = ASCIT_REAL START_BYTE = 92 BTTES = 8 FORMAT = "FE.2" UNIT = NANOTESIA DESCRIPTION = "Magnetic field X component, calibrated, Orbiter coordinates" END_OBJECT = COLUMN NAME = "BY" DATA TYPE = ASCIT_REAL START_BYTE = 101 BTTES = 8 FORMAT = "FS.2" UNIT = NANOTESIA DESCRIPTION = "Magnetic field Y component, calibrated, Orbiter coordinates" END_OBJECT = COLUMN NAME = "BY" DATA TYPE = ASCIT_REAL START_BYTE = 101 BTTES = 8 FORMAT = "FS.2" UNIT = NANOTESIA DESCRIPTION = "Magnetic field Y component, calibrated, Orbiter coordinates" END_OBJECT = COLUMN OBJECT = COLUMN NAME = "FS.2" UNIT = NANOTESIA DESCRIPTION = "Agnetic field Y component, calibrated, Orbiter coordinates" END_OBJECT = COLUMN NAME = "BZ" DATA TYPE = ASCIT_REAL START_BYTE = 110 BTTES = 8 FORMAT = "FS.2" UNIT = NANOTESIA DATA TYPE = ASCIT_REAL START_BYTE = 110 BTTES = 8 FORMAT = "FS.2" UNIT = NANOTESIA DATA TYPE = ASCIT_REAL START_BYTE = 110 BTTES = 8 FORMAT = "FS.2" UNIT = NANOTESIA DESCRIPTION = "Magnetic field Z component, calibrated, Orbiter coordinates"		OBJECT	= COLUMN		
<pre>START BYTE = 75 - BYTES = 16 FORMAT = "F16.3" UNIT = KILOMETER DESCRIPTION = "2 component of the Spacecraft (Lander) position, ECLIPJ2000 coordinates" END_OBJECT = COLUMN OBJECT = COLUMN NAME = "BX" DATA_TYPE = ASCII_REAL START_BYTE = 92 BYTES = 8 FORMAT = "F8.2" UNIT = NANOTESLA DESCRIPTION = "Magnetic field X component, calibrated, Orbiter coordinates" END_OBJECT = COLUMN NAME = "BY" DATA_TYPE = ASCII_REAL START_BYTE = 101 BYTES = 8 FORMAT = "F8.2" UNIT = NANOTESLA DESCRIPTION = "Start NAME = "BY" DATA_TYPE = ASCII_REAL START_BYTE = 101 BYTES = 8 FORMAT = "F8.2" UNIT = NANOTESLA DESCRIPTION = "Magnetic field Y component, Calibrated, Orbiter coordinates" END_OBJECT = COLUMN OBJECT = COLUMN OBJECT = COLUMN OBJECT = COLUMN OBJECT = COLUMN NAME = "B2" DATA_TYPE = ASCII_REAL START_BYTE = 110 EXTES = 8 FORMAT = "B2" DATA_TYPE = ASCII_REAL START_BYTE = 110 EYTES = 8 FORMAT = "B2" DATA_TYPE = ASCII_REAL START_BYTE = 110 EYTES = 8 FORMAT = "B2" DATA_TYPE = ASCII_REAL START_BYTE = 110 EYTES = 8 FORMAT = "B2" UNIT = NANOTESLA DESCRIPTION = "Magnetic field Z component, CALUMN OBJECT = COLUMN NAME = "B2" DATA_TYPE = ASCII_REAL START_BYTE = 110 EYTES = 8 FORMAT = "B2." UNIT = NANOTESLA DESCRIPTION = "Magnetic field Z component, CALUMN ONT = NANOTESLA DESCRIPTION = "Magnetic field Z component, CALUMATENT = "B3.2" UNIT = NANOTESLA DESCRIPTION = "Magnetic field Z component, CALUMATENT = "B3.2" UNIT = NANOTESLA DESCRIPTION = "Magnetic field Z component, CALUMATENT = "B3.2" UNIT = NANOTESLA DESCRIPTION = "Magnetic field Z component, CALUMATENT = "Magnetic field Z compon</pre>					
BYTES ⁻ = 16 FORMAT = "F16.3" UNIT = KILOMETER DESCRIPTION = "Z component of the Spacecraft (Lander) position, ECLIPJ2000 coordinates" END_OBJECT = COLUMN NAME = "BX" DATA TYPE = ASCII_REAL START_BYTE = 92 BYTES ⁻ = 8 FORMAT = "F8.2" UNIT = NANOTESLA DESCRIPTION = "Magnetic field X component, calibrated, Orbiter coordinates" END_OBJECT = COLUMN NAME = "BY" DATA TYPE = ASCII_REAL START_BYTE = 101 BYTES ⁻ = 8 FORMAT = "F8.2" UNIT = NANOTESLA DESCRIPTION = "Magnetic field Y component, calibrated, Orbiter coordinates" END_OBJECT = COLUMN NAME = "BY" DATA TYPE = ASCII_REAL START_BYTE = 101 BYTES ⁻ = 8 FORMAT = "F8.2" UNIT = NANOTESLA DESCRIPTION = "Magnetic field Y component, calibrated, Orbiter coordinates" END_OBJECT = COLUMN NAME = "SZ" DATA TYPE = ASCII_REAL START_BYTE = 110 BYTES ⁻ = 8 FORMAT = "B2" DATA TYPE = ASCII_REAL START_BYTE = 110 BYTES ⁻ = 8 FORMAT = "S2." UNIT = NANOTESLA DESCRIPTION = "Magnetic field Z component, calibrated, Orbiter coordinates" END_OBJECT = COLUMN					
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UNIT = KILOMETER DESCRIPTION = "2 component of the Spacecraft (Lander) position, ELLIPJ2000 coordinates" END_OBJECT = COLUMN OBJECT = COLUMN NAME = "BX" DATA_TYPE = ASCII_REAL START_BYTE = 92 BYTES = 8 FORMAT = "F8.2" UNIT = NANOTESLA DESCRIPTION = "Magnetic field X component, calibrated, Orbiter coordinates" END_OBJECT = COLUMN NAME = "BY" DATA_TYPE = ASCII_REAL START_BYTE = 101 BYTES = 8 FORMAT = "F8.2" UNIT = NANOTESLA DESCRIPTION = "GLUMN NAME = "BY" DATA_TYPE = ASCII_REAL START_BYTE = 101 BYTES = 8 FORMAT = "F8.2" UNIT = NANOTESLA DESCRIPTION = "Magnetic field Y component, calibrated, Orbiter coordinates" END_OBJECT = COLUMN OBJECT = COLUMN OBJECT = COLUMN OBJECT = COLUMN OBJECT = COLUMN NAME = "BZ" DATA_TYPE = ASCII_REAL START_BYTE = 110 BYTES = 8 FORMAT = "F8.2" UNIT = NANOTESLA DESCRIPTION = "Magnetic field 2 component, calibrated, Orbiter coordinates"					
DESCRIPTION = "Z component of the Spacecraft (Lander) position, ECLIPJ2000 coordinates" END_OBJECT = COLUMN NAME = "EX" DATA_TYPE = ASCII_REAL START_BYTE = 92 BYTES = 8 FORMAT = "F8.2" UNIT = NANOTESLA DESCRIPTION = "Magnetic field X component, calibrated, Orbiter coordinates" END_OBJECT = COLUMN NAME = "BY" DATA_TYPE = ASCII_REAL START_BYTE = 101 BYTES = 8 FORMAT = "F8.2" UNIT = NANOTESLA DESCRIPTION = "Magnetic field Y component, calibrated, Orbiter coordinates" END_OBJECT = COLUMN OBJECT = COLUMN NAME = "BY" DATA_TYPE = ASCII_REAL START_BYTE = 101 BYTES = 8 FORMAT = "F8.2" UNIT = NANOTESLA DESCRIPTION = "Magnetic field Y component, calibrated, Orbiter coordinates" END_OBJECT = COLUMN OBJECT = COLUMN OBJECT = COLUMN NAME = "BZ" DATA_TYPE = ASCII_REAL START_BYTE = 110 BYTES = 8 FORMAT = "F8.2" UNIT = NANOTESLA DESCRIPTION = "Magnetic field Z component, calibrated, Orbiter coordinates"					
ELIPJ2000 coordinates" END_OBJECT = COLUMN OBJECT = COLUMN NAME = "15X" DATA TYPE = ASCII_REAL START_BYTE = 92 BYTES = 8 FORMAT = "F6.2" UNIT = NANOTESLA DESCRIPTION = "Magnetic field X component, calibrated, Orbiter coordinates" END_OBJECT = COLUMN NAME = "BY" DATA_TYPE = ASCII_REAL START_BYTE = 101 BYTES = 8 FORMAT = "F8.2" UNIT = NANOTESLA DESCRIPTION = "Magnetic field Y component, calibrated, Orbiter coordinates" END_OBJECT = COLUMN OBJECT = COLUMN NAME = "S?" UNIT = NANOTESLA DESCRIPTION = "Magnetic field Y component, calibrated, Orbiter coordinates" END_OBJECT = COLUMN NAME = "S2" DATA_TYPE = ASCII_REAL START_BYTE = 110 BYTES = 8 FORMAT = "F8.2" UNIT = NANOTESLA DESCRIPTION = "Magnetic field Y component, calibrated, Orbiter coordinates" END_OBJECT = COLUMN NAME = "S2" DATA_TYPE = ASCII_REAL START_BYTE = 110 BYTES = 8 FORMAT = "F6.2" UNIT = NANOTESLA DESCRIPTION = "Magnetic field Z component, calibrated, Orbiter coordinates"				cecraft (Lander)	position,
- OBJECT = COLUMN NAME = "BX" DATA TYPE = ASCII_REAL START_BYTE = 92 BYTES = 8 FORMAT = "F8.2" UNIT = NANOTESLA DESCRIPTION = "Magnetic field X component, calibrated, Orbiter coordinates" END_OBJECT = COLUMN OBJECT = COLUMN NAME = "BY" DATA_TYPE = ASCII_REAL START_BYTE = 101 BYTES = 8 FORMAT = "F8.2" UNIT = NANOTESLA DESCRIPTION = "Magnetic field Y component, calibrated, Orbiter coordinates" END_OBJECT = COLUMN OBJECT = COLUMN NAME = "BZ" DATA_TYPE = ASCII_REAL START_BYTE = 110 BYTES = 8 FORMAT = "F8.2" UNIT = NANOTESLA DESCRIPTION = "Magnetic field Z component, calibrated, Orbiter coordinates"					
NAME = "BX" DATA_TYPE = ASCII_REAL START_BYTE = 92 BYTES = 8 FORMAT = "F8.2" UNIT = NANOTESLA DESCRIPTION = "Magnetic field X component, calibrated, Orbiter coordinates" END_OBJECT = COLUMN NAME = "BY" DATA_TYPE = ASCII_REAL START_BYTE = 101 BYTES = 8 FORMAT = "F8.2" UNIT = NANOTESLA DESCRIPTION = "Magnetic field Y component, calibrated, Orbiter coordinates" END_OBJECT = COLUMN NAME = "BZ" UNIT = NANOTESLA DESCRIPTION = "Magnetic field Y component, calibrated, Orbiter coordinates" END_OBJECT = COLUMN NAME = "BZ" DATA_TYPE = ASCII_REAL START_BYTE = 110 BYTES = 8 FORMAT = "F8.2" UNIT = NANOTESLA DESCRIPTION = "Magnetic field Z component, calibrated, Orbiter coordinates"		END_OBJECT	= COLUMN		
DATA_TYPE = ASCII_REAL START_BYTE = 92 BYTES = 8 FORMAT = "F8.2" UNIT = NANOTESLA DESCRIPTION = "Magnetic field X component, calibrated, Orbiter coordinates" END_OBJECT = COLUMN NAME = "BY" DATA_TYPE = ASCII_REAL START_BYTE = 101 BYTES = 8 FORMAT = "F8.2" UNIT = NANOTESLA DESCRIPTION = "Magnetic field Y component, calibrated, Orbiter coordinates" END_OBJECT = COLUMN NAME = "BZ" DATA_TYPE = ASCII_REAL START_BYTE = 101 BYTES = 8 FORMAT = "F8.2" UNIT = COLUMN OBJECT = COLUMN NAME = "BZ" DATA_TYPE = ASCII_REAL START_BYTE = 110 BYTES = 8 FORMAT = "F8.2" UNIT = NANOTESLA DESCRIPTION = "Magnetic field Z component, calibrated, Orbiter coordinates"		OBJECT			
<pre>START_BYTE = 92 BYTES = 8 FORMAT = "F8.2" UNIT = NANOTESLA DESCRIPTION = "Magnetic field X component, calibrated, Orbiter coordinates" END_OBJECT = COLUMN NAME = "BY" DATA_TYPE = ASCII_REAL START_BYTE = 101 BYTES = 8 FORMAT = "F8.2" UNIT = NANOTESLA DESCRIPTION = "Magnetic field Y component, calibrated, Orbiter coordinates" END_OBJECT = COLUMN OBJECT = COLUMN OBJECT = COLUMN NAME = "S2" DATA_TYPE = ASCII_REAL START_BYTE = 110 BYTES = 8 FORMAT = "F8.2" UNIT = SACII_REAL START_BYTE = 110 BYTES = 8 FORMAT = "F8.2" UNIT = NANOTESLA DESCRIPTION = "Magnetic field Z component, calibrated, Orbiter coordinates"</pre>					
BYTES = 8 FORMAT = "F8.2" UNIT = NANOTESLA DESCRIPTION = "Magnetic field X component, calibrated, Orbiter coordinates" END_OBJECT = COLUMN OBJECT = COLUMN OBJECT = COLUMN NAME = "BY" DATA_TYPE = ASCII_REAL START_BYTE = 101 BYTES = 8 FORMAT = "F8.2" UNIT = NANOTESLA DESCRIPTION = "Magnetic field Y component, calibrated, Orbiter coordinates" END_OBJECT = COLUMN NAME = "BZ" DATA_TYPE = ASCII_REAL START_BYTE = 110 BYTES = 8 FORMAT = "F8.2" UNIT = NANOTESLA DESCRIPTION = "BZ" DATA_TYPE = ASCII_REAL START_BYTE = 110 BYTES = 8 FORMAT = "F8.2" UNIT = NANOTESLA DESCRIPTION = "ANOTESLA DESCRIPTION = "ANOTESLA					
FORMAT = "F8.2" UNIT = NANOTESLA DESCRIPTION = "Magnetic field X component, calibrated, Orbiter coordinates" END_OBJECT = COLUMN NAME = "BY" DATA TYPE = ASCII_REAL START_BYTE = 101 BYTES = 8 FORMAT = "F8.2" UNIT = NANOTESLA DESCRIPTION = "Magnetic field Y component, calibrated, Orbiter coordinates" END_OBJECT = COLUMN NAME = "BZ" DATA_TYPE = ASCII_REAL START_BYTE = 110 BYTES = 8 FORMAT = "F8.2" UNIT = NANOTESLA DESCRIPTION = "Agnetic field Y component, calibrated, Orbiter coordinates" END_OBJECT = COLUMN NAME = "BZ" DATA_TYPE = ASCII_REAL START_BYTE = 110 BYTES = 8 FORMAT = "F8.2" UNIT = NANOTESLA DESCRIPTION = "Magnetic field Z component, calibrated, Orbiter coordinates"					
UNIT = NANOTESLA DESCRIPTION = "Magnetic field X component, calibrated, Orbiter coordinates" END_OBJECT = COLUMN OBJECT = COLUMN NAME = "BY" DATA_TYPE = ASCII_REAL START_BYTE = 101 BYTES = 8 FORMAT = "F8.2" UNIT = NANOTESLA DESCRIPTION = "Magnetic field Y component, calibrated, Orbiter coordinates" END_OBJECT = COLUMN NAME = "BZ" DATA_TYPE = ASCII_REAL START_BYTE = 110 BYTES = 8 FORMAT = "F8.2" UNIT = NANOTESLA DESCRIPTION = "BZ" DATA_TYPE = ASCII_REAL START_BYTE = 110 BYTES = 8 FORMAT = "F8.2" UNIT = NANOTESLA DESCRIPTION = "Magnetic field Z component, calibrated, Orbiter coordinates"					
calibrated, Orbiter coordinates" END_OBJECT = COLUMN NAME = "BY" DATA_TYPE = ASCII_REAL START_BYTE = 101 BYTES = 8 FORMAT = "F8.2" UNIT = NANOTESLA DESCRIPTION = "Magnetic field Y component, calibrated, Orbiter coordinates" END_OBJECT = COLUMN OBJECT = COLUMN OBJECT = COLUMN OBJECT = COLUMN OBJECT = SACII_REAL START_BYTE = 110 BYTES = 8 FORMAT = "F8.2" UNIT = NANOTESLA DESCRIPTION = "Magnetic field Z component, calibrated, Orbiter coordinates"					
END_OBJECT= COLUMNOBJECT= COLUMNNAME"BY"DATA_TYPE= ASCII_REALSTART_BYTE= 101BYTES= 8FORMAT"F8.2"UNIT= NANOTESLADESCRIPTION= "Magnetic field Y component, calibrated, Orbiter coordinates"END_OBJECT= COLUMNOBJECT= COLUMNOBJECT= COLUMNBYTES= 8FORMAT"F8.2"UNIT= NANOTESLADATA_TYPE= ASCII_REALSTART_BYTE= 110BYTES= 8FORMAT= "F8.2"UNIT= NANOTESLADESCRIPTION= "Magnetic field Z component, calibrated, Orbiter coordinates"		DESCRIPTION	= "Magnetic field X compor	nent,	
<pre> OBJECT = COLUMN NAME = "BY" DATA_TYPE = ASCII_REAL START_BYTE = 101 BYTES = 8 FORMAT = "F8.2" UNIT = NANOTESLA DESCRIPTION = "Magnetic field Y component, calibrated, Orbiter coordinates" END_OBJECT = COLUMN OBJECT = COLUMN OBJECT = COLUMN OBJECT = COLUMN NAME = "BZ" DATA_TYPE = ASCII_REAL START_BYTE = 110 BYTES = 8 FORMAT = "F8.2" UNIT = NANOTESLA DESCRIPTION = "Magnetic field Z component, calibrated, Orbiter coordinates"</pre>				ordinates"	
<pre>NAME = "BY" DATA_TYPE = ASCII_REAL START_BYTE = 101 BYTES = 8 FORMAT = "F8.2" UNIT = NANOTESLA DESCRIPTION = "Magnetic field Y component, calibrated, Orbiter coordinates" END_OBJECT = COLUMN OBJECT = COLUMN NAME = "BZ" DATA_TYPE = ASCII_REAL START_BYTE = 110 BYTES = 8 FORMAT = "F8.2" UNIT = NANOTESLA DESCRIPTION = "Magnetic field Z component, calibrated, Orbiter coordinates"</pre>		END_OBJECT	= COLUMN		
DATA_TYPE = ASCII_REAL START_BYTE = 101 BYTES = 8 FORMAT = "F8.2" UNIT = NANOTESLA DESCRIPTION = "Magnetic field Y component, calibrated, Orbiter coordinates" END_OBJECT = COLUMN NAME = "BZ" DATA_TYPE = ASCII_REAL START_BYTE = 110 BYTES = 8 FORMAT = "F8.2" UNIT = NANOTESLA DESCRIPTION = "Magnetic field Z component, calibrated, Orbiter coordinates"					
START_BYTE= 101BYTES= 8FORMAT= "F8.2"UNITNANOTESLADESCRIPTION= "Magnetic field Y component, calibrated, Orbiter coordinates"END_OBJECT= COLUMNOBJECT= COLUMNNAME= "BZ" DATA_TYPEDATA_TYPE= ASCII_REAL START_BYTESTART_BYTE= 110 BYTESBYTES= 8 FORMATFORMAT= "F8.2" UNITUNITNANOTESLA DESCRIPTIONDESCRIPTION= "Magnetic field Z component, calibrated, Orbiter coordinates"					
BYTES = 8 FORMAT = "F8.2" UNIT = NANOTESLA DESCRIPTION = "Magnetic field Y component, calibrated, Orbiter coordinates" END_OBJECT = COLUMN OBJECT = COLUMN NAME = "BZ" DATA_TYPE = ASCII_REAL START_BYTE = 110 BYTES = 8 FORMAT = "F8.2" UNIT = NANOTESLA DESCRIPTION = "Magnetic field Z component, calibrated, Orbiter coordinates"		_			
FORMAT= "F8.2"UNITNANOTESLADESCRIPTION= "Magnetic field Y component, calibrated, Orbiter coordinates"END_OBJECT= COLUMNOBJECT= COLUMNNAME= "BZ" DATA_TYPEDATA_TYPE= ASCII_REAL START_BYTESTART_BYTE= 110BYTES= 8 FORMATFORMAT= "F8.2" UNITUNIT= NANOTESLA DESCRIPTIONESCRIPTION= "Magnetic field Z component, calibrated, Orbiter coordinates"		—			
UNIT = NANOTESLA DESCRIPTION = "Magnetic field Y component, calibrated, Orbiter coordinates" END_OBJECT = COLUMN OBJECT = COLUMN NAME = "BZ" DATA_TYPE = ASCII_REAL START_BYTE = 110 BYTES = 8 FORMAT = "F8.2" UNIT = NANOTESLA DESCRIPTION = "Magnetic field Z component, calibrated, Orbiter coordinates"					
calibrated, Orbiter coordinates"END_OBJECT= COLUMNOBJECT= COLUMNNAME= "BZ"DATA_TYPE= ASCII_REALSTART_BYTE= 110BYTES= 8FORMAT= "F8.2"UNIT= NANOTESLADESCRIPTION= "Magnetic field Z component, calibrated, Orbiter coordinates"					
END_OBJECT = COLUMN OBJECT = COLUMN NAME = "BZ" DATA_TYPE = ASCII_REAL START_BYTE = 110 BYTES = 8 FORMAT = "F8.2" UNIT = NANOTESLA DESCRIPTION = "Magnetic field Z component, calibrated, Orbiter coordinates"		DESCRIPTION	5	-	
OBJECT = COLUMN NAME = "BZ" DATA_TYPE = ASCII_REAL START_BYTE = 110 BYTES = 8 FORMAT = "F8.2" UNIT = NANOTESLA DESCRIPTION = "Magnetic field Z component, calibrated, Orbiter coordinates"		END OBJECT		rdinates"	
NAME = "BZ" DATA_TYPE = ASCII_REAL START_BYTE = 110 BYTES = 8 FORMAT = "F8.2" UNIT = NANOTESLA DESCRIPTION = "Magnetic field Z component, calibrated, Orbiter coordinates"			COLORIN		
DATA_TYPE = ASCII_REAL START_BYTE = 110 BYTES = 8 FORMAT = "F8.2" UNIT = NANOTESLA DESCRIPTION = "Magnetic field Z component, calibrated, Orbiter coordinates"		OBJECT	= COLUMN		
START_BYTE=110BYTES=8FORMAT="F8.2"UNIT=NANOTESLADESCRIPTION="Magnetic field Z component, calibrated, Orbiter coordinates"					
BYTES = 8 FORMAT = "F8.2" UNIT = NANOTESLA DESCRIPTION = "Magnetic field Z component, calibrated, Orbiter coordinates"		—			
FORMAT= "F8.2"UNIT= NANOTESLADESCRIPTION= "Magnetic field Z component, calibrated, Orbiter coordinates"					
UNIT = NANOTESLA DESCRIPTION = "Magnetic field Z component, calibrated, Orbiter coordinates"					
DESCRIPTION = "Magnetic field Z component, calibrated, Orbiter coordinates"					
calibrated, Orbiter coordinates"				nent,	
END_OBJECT = COLUMN					
		END_OBJECT	= COLUMN		

4.3.7.4.4 Level H data object definition (calibrated in ECLIP J2000 coordinates)Each TAB file contains an eight columns table with the magnetic field and the spacecraft position.

OBJECT =	= TABLE
NAME =	= "ROMAP_MAG_CALSCH_TABLE"
INTERCHANGE_FORMAT =	= ASCII
ROWS =	=
COLUMNS =	= 8
ROW_BYTES =	= 119



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^STRUCTURE	=	"ROMAP	MAG	CALSCH.	FMT"
END_OBJECT	=	TABLE		-	

The structure of the TABLE object is described in the file ROMAP_MAG_CALSCH.FMT as follows:

Contents of format file "ROMAP MAG CALSCH.FMT" /* /* */ Level F data object definition : /* */ calibrated in ECLIP J2000 coordinates OBJECT = COLUMN = "UTC" NAME DATA TYPE = TIME = 1 START_BYTE BYTES = 23 = "This column represents the UTC DESCRIPTION Of the magnetic field vector in PDS standard format YYYY-MM-DDThh:mm:ss.sss" END OBJECT = COLUMN OBJECT = COLUMN = "OBT" NAME = ASCII_REAL DATA TYPE = 25 START BYTE BYTES = 15 = SECOND UNTT FORMAT = "F15.5" DESCRIPTION = "ROMAP 4 bytes counter representing the measurement time synchronized with Lander On Board Time. The time resolution is 0.03125 s" END OBJECT = COLUMN OBJECT = COLUMN = "POS X" NAME = ASCIĪ REAL DATA TYPE $STAR\overline{T}$ BYTE = 41 = 16 BYTES = "F16.3" FORMAT UNIT = KILOMETER DESCRIPTION = "X component of the Spacecraft (Lander) position, ECLIPJ2000 coordinates" END OBJECT = COLUMN OBJECT = COLUMN = "POS_Y" NAME DATA TYPE = ASCII REAL START BYTE = 58 BYTES = 16 = "F16.3" FORMAT UNIT = KILOMETER DESCRIPTION = "Y component of the Spacecraft (Lander) position, ECLIPJ2000 coordinates" END OBJECT = COLUMN OBJECT = COLUMN = "POS Z" NAME DATA TYPE = ASCII REAL START BYTE = 75 = 16 BYTES = "F16.3" FORMAT UNIT = KILOMETER DESCRIPTION = "Z component of the Spacecraft (Lander) position, ECLIPJ2000 coordinates" = COLUMN END OBJECT = COLUMN = "BX" OBJECT NAME

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DATA_TYPE START_BYTE BYTES FORMAT UNIT	= ASCII_REAL = 92 = 8 = "F8.2"		
DESCRIPTION	<pre>= NANOTESLA = "Magnetic field X component, calibrated, ECLIPJ2000 coordinates"</pre>		
END_OBJECT	= COLUMN		
OBJECT NAME DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION END OBJECT	<pre>= COLUMN = "BY" = ASCII_REAL = 101 = 8 = "F8.2" = NANOTESLA = "Magnetic field Y compon calibrated, ECLIPJ2000 c = COLUMN</pre>		
- OBJECT DATA_TYPE START_BYTE BYTES FORMAT UNIT DESCRIPTION	<pre>= COLUMN = "BZ" = ASCII_REAL = 110 = 8 = "F8.2" = NANOTESLA = "Magnetic field Z compon calibrated, ECLIPJ2000 c</pre>		
END_OBJECT	= COLUMN		

4.3.7.5 Description of Instrument

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

5 Appendix: Available Software to read PDS files

The level 3 housekeeping and science PDS files can be read with the PDS table verifier tool "tbtool" and readpds (Small Bodies Node tool).

6 Appendix: Example of PDS detached label for ROMAP MAG level 2 data product

PDS_VERSION_ID = PDS3 LABEL_REVISION_NOTE = "2007-07-16, SONC, version 1.0" /* PVV version 3.0 */ /* Edited Science data */ /* FILE CHARACTERISTIC DATA ELEMENTS */ RECORD_TYPE = FIXED_LENGTH FILE_RECORDS = 18990 RECORD_BYTES = 65 FILE_NAME = "MAG_FS2_070225015459_00004.TAB" /* DATA OBJECT POINTERS */



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^ROMAP MAG RAWSC TABLE = ("MAG_FS2_070225015459_00004.TAB",1 <BYTES>) DATA_SET_ID = "RL-CAL-ROMAP-2-MARS-MAG-V1.0" = "ROSETTA-LANDER MARS ROMAP 2 MARS MAG V1.0" = "MAG_FS2_070225015459_00004" DATA SET NAME PRODUCT ID PRODUCT_CREATION_TIME = 2008-03-17T10:20:01 MISSION_NAME = "INTERNATIONAL ROSETTA MISSION" MISSION_PHASE_NAME = "MARS SWING-BY" MISSION ID = ROSETTA INSTRUMENT_HOST_NAME = "ROSETTA-LANDER" INSTRUMENT HOST ID = RL PRODUCT TYPE = EDR START TIME = 2007-02-25T01:54:59.194 STOP TIME = 2007-02-25T01:59:55.303 SPACECRAFT CLOCK START COUNT = "1/130989270.09" SPACECRAFT_CLOCK_STOP_COUNT = "1/130989566.12" = "SONC" PRODUCER ID PRODUCER FULL NAME = "SCIENCE OPERATIONS AND NAVIGATION CENTER" PRODUCER INSTITUTION NAME = "CNES" INSTRUMENT ID = ROMAP INSTRUMENT_NAME INSTRUMENT_TYPE = UNK = {"FLUXGATE MAGNETOMETER", "ELECTROSTATIC ANALYZER", "FARADAY CUP" } = MAG DETECTOR_ID DETECTOR DESC = "Magnetometer" INSTRUMENT_MODE_ID = "N/A" INSTRUMENT MODE DESC = "N/A" = "MARS" TARGET NAME = "PLANET" TARGET TYPE PROCESSING_LEVEL_ID = "2" = ``-1″ DATA QUALITY ID = "-1 : NOT QUALIFIED" DATA_QUALITY_DESC /* GEOMETRY PARAMETERS */ /* SPACECRAFT LOCATION: Position <km> */ SC SUN POSITION VECTOR = (-18553289.9, 195616341.6, 90223877.3) /* TARGET PARAMETERS: Position <km>, Velocity <km/s> */ SC_TARGET_POSITION_VECTOR = (-153787159.6, 250943772.8, 114210041.1) SC_TARGET_VELOCITY_VECTOR = (-35.3, -20.1, -8.6) /* SPACECRAFT_POSITION_WITH_RESPECT_TO_CENTRAL_BODY */ SPACECRAFT ALTITUDE = 315694750.8 <km> SUB_SPACECRAFT_LATITUDE = -21.06 <deg> SUB_SPACECRAFT_LONGITUDE = 122.76 <deg> NOTE = "The values of the keywords SC SUN POSITION VECTOR, SC_TARGET_POSITION_VECTOR and SC_TARGET_VELOCITY_VECTOR are related to the EMEJ2000 reference frame. The values of SUB SPACECRAFT LATITUDE and SUB SPACECRAFT LONGITUDE are northern latitude and eastern longitude in the standard planetocentric IAU <TARGET NAME> frame. All values are computed for the time = START_TIME. Distances are given in <km> velocities in <km/s>, Angles in <deg>" /* DATA OBJECT DEFINITION */ OBJECT = ROMAP MAG RAWSC TABLE NAME = "ROMAP MAG EDITED SCIENCE DATA" INTERCHANGE FORMAT = ASCII = 18990 ROWS COLUMNS = .5 ROW BYTES = 65

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^STRUCTURE END_OBJECT = "ROMAP_MAG_RAWSC.FMT"

= ROMAP_MAG_RAWSC_TABLE

END

7 Appendix: Example of PDS combined detached label for ROMAP SPM level 2 data product

PDS VERSION ID = PDS3 LABEL REVISION NOTE = "2009-03-16, SONC, version 1.0" /* PVV version 3.0 */ /* Edited Science data (Level 2) */ = "RL-CAL-ROMAP-2-CVP-SPM-V1.0" DATA_SET_ID DATA SET NAME = "ROSETTA-LANDER CAL ROMAP 2 CVP SPM V1.0" PRODUCT TD = "SDM ES2 040514012124" PRODUCT_ID = "SPM_FS2_0405140131 PRODUCT_CREATION_TIME = 2009-03-11T08:29:37 = "SPM FS2 040514013124" = "INTERNATIONAL ROSETTA MISSION" MISSION_NAME = "COMMISSIONING" MISSION_PHASE_NAME MISSION_ID = ROSETTA INSTRUMENT HOST NAME = "ROSETTA-LANDER" = RL INSTRUMENT HOST ID PRODUCT TYPE = EDR START TIME = 2004-05-14T01:31:24.815 STOP TIME = 2004-05-14T01:34:17.627 SPACECRAFT CLOCK START COUNT = "031312529.93750" SPACECRAFT CLOCK STOP COUNT = "042637969.93750" PRODUCER ID = "SONC" PRODUCER FULL NAME = "SCIENCE OPERATIONS AND NAVIGATION CENTER" PRODUCER_INSTITUTION_NAME = "CNES" INSTRUMENT ID = ROMAP = "N/A" INSTRUMENT NAME = {"FLUXGATE MAGNETOMETER","ELECTROSTATIC ANALYZER", INSTRUMENT_TYPE "FARADAY CUP" } DETECTOR ID = SPM = "Simple Plasma Monitor" DETECTOR DESC = "N/A" INSTRUMENT MODE ID INSTRUMENT_MODE_DESC = "N/A" TARGET_NAME = "CALIBRATION" = "CALIBRATION" TARGET TYPE PROCESSING LEVEL ID = "2" DATA_QUALITY ID = "-1" DATA_QUALITY_DESC = "-1 : NOT QUALIFIED" /* GEOMETRY PARAMETERS */ /* SPACECRAFT LOCATION: Position <km> */ SC SUN POSITION VECTOR = (58256145.8, 110046457.3, 46674031.2) /* TARGET PARAMETERS: Position <km>, Velocity <km/s> */
SC_TARGET_POSITION_VECTOR = (`N/A", "N/A", "N/A")
SC_TARGET_VELOCITY_VECTOR = (`N/A", "N/A", "N/A")
/* SPACECRAFT_POSITION_WITH_RESPECT_TO_CENTRAL_BODY */ SPACECRAFT ALTITUDE = 31680363.9 <km> SUB_SPACECRAFT_LATITUDE = 3.08 <deg> SUB_SPACECRAFT_LONGITUDE = 108.33 <deg>
NOTE = "The values of the keywords SC_SUN_POSITION_VECTOR, SC TARGET POSITION VECTOR and SC TARGET VELOCITY VECTOR



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END_OBJECT	= FILE		
OBJECT RECORD_TYPE FILE_RECORDS RECORD_BYTES ^ROMAP_SPM_PAR_FC_TABLE OBJECT NAME INTERCHANGE_FORMAT ROWS COLUMNS ROW_BYTES ^STRUCTURE END_OBJECT END_OBJECT	= FILE = FIXED_LENGTH = 54 = 119 = "SPMF_FS2_0405140 = ROMAP_SPM_PAR_FC = ROMAP_SPM_PAR_FC = 54 = 12 = 119 = "ROMAP_SPM_FC.FMT" = ROMAP_SPM_PAR_FC_T	ч	
OBJECT RECORD_TYPE FILE_RECORDS RECORD_BYTES ^ROMAP_SPM_PAR_ELEC_TABLE OBJECT NAME INTERCHANGE_FORMAT ROWS COLUMNS ROW_BYTES ^STRUCTURE END_OBJECT END_OBJECT	= FILE = FIXED_LENGTH = 96 = 119 = "SPME_FS2_0405140] = ROMAP_SPM_PAR_ELE(= ASCII = 96 = 12 = 119 = "ROMAP_SPM_ELEC.FI = ROMAP_SPM_PAR_ELE(= FILE	C_TABLE	

END

8 Appendix: Example of Directory Listing of Data Set RL-CAL-ROMAP-2-CVP-SPM-V1.0

-AAREADME.TXT	
 -CATALOG 	-CATINFO.TXT -DATASET.CAT -INST.CAT -INSTHOST.CAT -MISSION.CAT -PERSON.CAT -REF.CAT -SOFTWARE.CAT
	-HK -RHK_FH2_040908120217_02155.LBL -RHK_FH2_040908120217_02155.TAB
	<pre> -SPME_FS2_040514013124.TAB -SPME_FS2_041007004354.TAB -SPME_FS2_041007004502.TAB -SPME_FS2_041009001317.TAB -SPME_FS2_041009001425.TAB -SPMF_FS2_040514013124.TAB -SPMF_FS2_041007004354.TAB -SPMF_FS2_041007004502.TAB</pre>
	-SPMF_FS2_041009001317.TAB -SPMF_FS2_041009001425.TAB -SPMP_FS2_040514013124_CNA.TAB -SPMP_FS2_040514013124_CNE.TAB

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-RL-CAL-ROMAP-2-CVP-SPM-V1.0-	-DATA	-SPMP -SC -SPMP -SPMP -SPMP -SPMP -SPMP -SPMP -SPMP -SPMP -SPMR -SPMR -SPMR -SPMR -SPMR -SPMF -SPMF -SPM_F	FS2_040514013124_CRA.TAB FS2_040514013124_CRE.TAB FS2_041007004502_CNA.TAB FS2_041007004502_CRA.TAB FS2_041007004502_CRA.TAB FS2_041007004502_CRE.TAB FS2_041009001425_CNA.TAB FS2_041009001425_CRA.TAB FS2_041009001425_CRE.TAB FS2_041009001425_CRE.TAB FS2_041009001425_CRE.TAB FS2_041009001317_CN.TAB FS2_041009001317_CN.TAB FS2_041009001317_CR.TAB S2_041007004354_RAW.LBL S2_041007004354_RAW.LBL S2_041007004354_RAW.LBL S2_041007004354_RAW.LBL S2_041007004354_RAW.LBL S2_041009001317_RAW.LBL S2_041009001317_RAW.LBL S2_041009001317_RAW.LBL
	-DOCUMENT	-DOCINFO.TXT -EAICD_ROMAP.DOC -EAICD_ROMAP.LBL -RO-LRO-DP-300002 -RO-LRO-DP-300002 -ROMAP_CALIBRATIO -ROMAP_CALIBRATIO -TIMELINE_CVP_DESG -TIMELINE_CVP_PARG -TIMELINE_CVP_PARG -TIMELINE_CVP_PARG -TIMELINE_CVP_PARG -TIMELINE_CVP_PARG -TIMELINE_CVP_PARG	-UA.PDF N_DESC.TXT N_DESC.LBL C.TXT T1.LBL T1.PNG T2.LBL
	-INDEX	-INDEX.LBL -INDEX.TAB	
	-LABEL	-LABINFO.TXT -ROMAP_RAWHK.FMT -ROMAP_SPM_ELEC.FM -ROMAP_SPM_FC.FMT -ROMAP_SPM_PAR_IOI -ROMAP_SPM_PAR_IOI -ROMAP_SPM_PAR_IOI -ROMAP_SPM_PAR_IOI -ROMAP_SPM_RAW_IOI -ROMAP_SPM_RAW_IOI	N_CNA.FMT N_CNE.FMT N_CRA.FMT N_CRE.FMT N_CN.FMT