



# ROSETTA ROSINA

## S/C - DPU Command Description

ROS-TUB-MA-07/1.2

Revision 1.2

15.11.2001

Prepared by Thierry  
Sémon, UoB Elsa  
Montagnon, ESOC  
Björn Fiethe, IDA

## 1. Document Change Record

Rev.	Date	Pages	Description
1.0	22.10.01	All	First Issue
1.1	05.11.01	All	Update correct database parameter names
1.2	15.11.01	5,6,8, 19,20, 22,37, 38	Add Enable and SetValue commands

## 2. Reference Documentation

Document Name	Document Number	Revision
RD[1] DPU Housekeeping Reports	ROS-TUB-SP-02/2.4	04.07.2001
RD[2] DPU Science Data Packets	ROS-TUB-SP-03/1.1	01.09.2000
RD[3] S/C – DPU Command Packets	ROS-TUB-SP-04/2.2	04.07.2001
RD[4] DPU Event Packets	ROS-TUB-SP-05/2.3	04.07.2001
RD[5] DPU Memory Management Services	ROS-TUB-SP-06/1.3	14.07.2000
RD[6] DPU Context Transfer Service	ROS-TUB-SP-07/1.0	10.07.2001
RD[7] Rosina Mode Change Commands	ROS-TUB-MA-05/2.2	23.08.2001

### 3. Sensor Commands

#### 3.1 DFMS

Type No.	Name	RSDB	Serv	Sub-Serv	Param Count	Enable	Short Description
D1	D1_Direct	ZRND1001	196	1	1	X	Direct DFMS Command
D2	D_Enable	ZRND1002	196	2	2		Enable Critical Command
D10	D2_SetValue	ZRND2001	196	10	4	X	Set & Verify Value
D11	D2_Execute	ZRND2002	196	11	1		Execute single Command
D12	D2_Function	ZRND2003	196	12	5		Call Function
D30	D3_Execute	ZRND3001	196	30	1		Execute Sequence
D31	D3_Function	ZRND3002	196	31	9		Call Function Sequence
D33	D3_Acquisition	ZRND3004	196	33	5		Acquisition & Readout
D50	D4_Mode	ZRND4001	196	50	8		Set & Operate single Mode
D51	D4_ScanMode	ZRND4002	196	51	10		Operate Scan Mode
D52	D4_LoadLUT	ZRND4003	196	52	5..79	X	Load Look Up Table
D53	D4_SetConv	ZRND4004	196	53	16	X	Set Conversion Parameter
D55	D4_LoadMode	ZRND4006	196	55	26	X	Load Mode Settings
D70	D5_Sequence	ZRND5001	196	70	5		Measurement Sequence
D71	D5_LoadSeq	ZRND5002	196	71	6..177	X	Load Sequence Table
D72	D5_Accumulate	ZRND5003	196	72	5	X	Set Accu. Parameter

##### 3.1.1 ZRND1001 (D1\_Direct)

Telecommand Packet Information			
Packet Name	<b>ZRND1001</b>	Instrument	ROSINA
Packet Description	D1_Direct		
Packet Function	Any three byte low-level command can be sent directly to the DFMS (see RD[3] and sensor documentation)		
Generation Rules			
Header Information			
Process ID	80	Packet Category	12
Service Type	196	Service Subtype	01
Structure ID		Packet length	16
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
PRNGG101	Command	4 octet	Contains 2 detailed parameters:
PRNDG101	Spare	1 octet	0
PRNDG102	Sensor Command	3 octet	DFMS low-level command code
Notes: For security, an enable command (ZRND1002) has to be sent before the direct command will be accepted by DPU. Internal use only.			

## 3.1.2 ZRND1002 (D\_Enable)

Telecommand Packet Information			
Packet Name	<b>ZRND1002</b>	Instrument	ROSINA
Packet Description	D_Enable		
Packet Function	Enable critical command (enable column marked in table 3.1)		
Generation Rules			
Header Information			
Process ID	80	Packet Category	12
Service Type	196	Service Subtype	02
Structure ID		Packet length	16
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
PRNGG102	Subservice	2 octet	Contains 2 detailed parameters:
PRNDG103	Spare	1 octet	0
PRNDG104	Subservice of critical cmd	1 octet	e.g. 1 for ZRND1001
PRNGG103	Opcode of critical cmd	2 octet	First two bytes of parameters (e.g. spare 0 and first byte of sensor cmd for ZRND1001)
Notes: One enable is valid until another enable command is sent.			

Telecommand Packet Information			
Packet Name	<b>ZRND12F8</b>	Instrument	ROSINA
Packet Description	D_Enable OD_COVER		
Packet Function	Enable DFMS cover command		
Generation Rules			
Header Information			
Process ID	80	Packet Category	12
Service Type	196	Service Subtype	02
Structure ID		Packet length	16
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	Subservice of cover cmd	2 octet	Fixed field set to 12
N/A	Opcode of cover cmd	2 octet	Fixed field set to 8
Notes: One enable is valid until another enable command is sent.			

Telecommand Packet Information			
Packet Name	<b>ZRND1201</b>	Instrument	ROSINA
Packet Description	D_Enable SetValue		
Packet Function	Enable DFMS SetValue command		
Generation Rules			
Header Information			
Process ID	80	Packet Category	12
Service Type	196	Service Subtype	02
Structure ID		Packet length	16
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	Subservice of cmd	2 octet	Fixed field set to 10
PRNGD101	Set Voltage No.	2 octet	Calcurve CRNVD101: MCPFront = 1 MCPBack = 2 HVFDP = 3 ISCIRP1 = 4 ISCIRP2 = 5 ISCISP = 6 ISCTLL = 7 ISCTLR = 8 MEPHVACC = 9 ASPESS1 = 10 ASPESS2 = 11 ASPRQ = 12 ASPHP = 13 ASPMP = 14 ASPZ1Q = 15 ASPZ2Q = 16 ASPESAC = 17 ASPESAO = 18 ASPESAI = 19 ASPESAO2 = 20 ASPESAI2 = 21 ASPESAO3 = 22 ASPESAI3 = 23 ASPESAO4 = 24 ASPESAI4 = 25 ASPESAO5 = 26 ASPESAI5 = 27 CEMREP = 28 ISCSLL = 29 ISCSLR = 30 ISCSES = 31 ISCSEB = 32 ASPHVBIAS = 33 MEPHVCEM = 34 FDPADCOFF = 35 ISCERP = 36 ISCF1BIAS = 37 ISCF2BIAS = 38 FDPFCOFF = 39
Notes: One enable is valid until another enable command is sent.			

## 3.1.3 ZRND2001 (D2\_SetValue)

Telecommand Packet Information			
Packet Name	<b>ZRND2001</b>	Instrument	ROSINA
Packet Description	D2_SetValue		
Packet Function	Set any DFMS internal voltage or parameter with the DPU general voltage set function (taking into account required stepping and monitoring, e.g. DFMS MCP Front)		
Generation Rules			
Header Information			
Process ID	80	Packet Category	12
Service Type	196	Service Subtype	10
Structure ID		Packet length	22
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
PRNGG201	Parameter No.	2 octet	Entry of set parameter in DPU cmd conversion table
PRNGG202	Parameter Value	4 octet	Set value in floating point
PRNGG203	Wait time in ms	2 octet	Optional wait time for HK monitoring after cmd was sent
PRNGG204	Monitoring No.	2 octet	Optional entry of related HK parameter in DPU monitoring table
Notes: Optional parameters will overwrite existing DPU internal parameters. For security, an enable command (ZRND1002) has to be sent before the command will be accepted by DPU. Internal use only.			

Telecommand Packet Information			
Packet Name	ZRND2100	Instrument	ROSINA
Packet Description	D2_SetValue DFMS voltage		
Packet Function	Set predefined DFMS internal voltages with the DPU general voltage set function (taking into account required stepping and monitoring)		
Generation Rules			
Header Information			
Process ID	80	Packet Category	12
Service Type	196	Service Subtype	10
Structure ID		Packet length	22
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
PRNGD101	Set Voltage No.	2 octet	Calcurve CRNVD101: MCPFront = 1 MCPBack = 2 HVFDP = 3 ISCIRP1 = 4 ISCIRP2 = 5 ISCISP = 6 ISCTLL = 7 ISCTLR = 8 MEPHVACC = 9 ASPESS1 = 10 ASPESS2 = 11 ASPRQ = 12 ASPHP = 13 ASPMP = 14 ASPZ1Q = 15 ASPZ2Q = 16 ASPESAC = 17 ASPESAO = 18 ASPESAI = 19 ASPESAO2 = 20 ASPESAI2 = 21 ASPESAO3 = 22 ASPESAI3 = 23 ASPESAO4 = 24 ASPESAI4 = 25 ASPESAO5 = 26 ASPESAI5 = 27 CEMREP = 28 ISCSLL = 29 ISCSLR = 30 ISCSES = 31 ISCSEB = 32 ASPHVBIAS = 33 MEPHVCEM = 34 FDPADCOFF = 35 ISCERP = 36 ISCF1BIAS = 37 ISCF2BIAS = 38 FDPFCOFF = 39
PRNGD102	Voltage Value	4 octet	Set value in floating point
N/A	Wait time in ms	2 octet	Fixed field set to 0
N/A	Monitoring No.	2 octet	Fixed field set to 0
Notes: For security, an enable command (ZRND1002) has to be sent before the command will be accepted by DPU. Internal use only.			



## 3.1.4 ZRND2002 (D2\_Execute)

Telecommand Packet Information			
Packet Name	<b>ZRND2200</b>	Instrument	ROSINA
Packet Description	D2_Init (D2_Execute)		
Packet Function	Set all DFMS voltages to initial values		
Generation Rules			
Header Information			
Process ID	80	Packet Category	12
Service Type	196	Service Subtype	11
Structure ID		Packet length	14
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	D2_Init	2 octet	Fixed field set to 0
Notes:			

Telecommand Packet Information			
Packet Name	<b>ZRND2204</b>	Instrument	ROSINA
Packet Description	D2_ISHeat_test (D2_Execute)		
Packet Function	Test DFMS ion source heater (10W) by switching it on for 10s		
Generation Rules	All DFMS HV shall be OFF and disabled. <b>Controlled high vacuum (&lt; 6 x 10<sup>-7</sup> mbar) has to be inside DFMS.</b>		
Header Information			
Process ID	80	Packet Category	12
Service Type	196	Service Subtype	11
Structure ID		Packet length	14
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	D2_ISHeat_test	2 octet	Fixed field set to 4
Notes: Command is used for ground tests only.			

Telecommand Packet Information			
Packet Name	<b>ZRND2205</b>	Instrument	ROSINA
Packet Description	D2_RDPHeat_test (D2_Execute)		
Packet Function	Test DFMS remote detector package heater by switching it on for 30s		
Generation Rules	<b>Controlled high vacuum (&lt; 6 x 10<sup>-7</sup> mbar) has to be inside DFMS.</b>		
Header Information			
Process ID	80	Packet Category	12
Service Type	196	Service Subtype	11
Structure ID		Packet length	14
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	D2_RDPHeat	2 octet	Fixed field set to 5
Notes: Command is used for ground tests only.			

Telecommand Packet Information			
Packet Name	<b>ZRND2212</b>	Instrument	ROSINA
Packet Description	D2_Heat_Off (D2_Execute)		
Packet Function	Switch off both ion source and RDP heater		
Generation Rules	<b>Controlled high vacuum (&lt; 6 x 10<sup>-7</sup> mbar) has to be inside DFMS.</b>		
Header Information			
Process ID	80	Packet Category	12
Service Type	196	Service Subtype	11
Structure ID		Packet length	14
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	D2_Heat_Off	2 octet	Fixed field set to 12
Notes:			

Telecommand Packet Information			
Packet Name	<b>ZRND2213</b>	Instrument	ROSINA
Packet Description	D2_ISHeat_On (D2_Execute)		
Packet Function	Switch on DFMS ion source heater (10 W) for cleaning		
Generation Rules	<b>Controlled high vacuum (&lt; 6 x 10<sup>-7</sup> mbar) has to be inside DFMS.</b>		
Header Information			
Process ID	80	Packet Category	12
Service Type	196	Service Subtype	11
Structure ID		Packet length	14
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	D2_ISHeat_On	2 octet	Fixed field set to 13
Notes:			

Telecommand Packet Information			
Packet Name	<b>ZRND2215</b>	Instrument	ROSINA
Packet Description	D2_EnaHV (D2_Execute)		
Packet Function	Enable HV (clear HV safe)		
Generation Rules	<b>Controlled high vacuum (&lt; 6 x 10<sup>-7</sup> mbar) has to be inside DFMS.</b>		
Header Information			
Process ID	80	Packet Category	12
Service Type	196	Service Subtype	11
Structure ID		Packet length	14
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	D2_EnaHV	2 octet	Fixed field set to 15
Notes:			

3.1.5 ZRND2003 (D2\_Function)

Telecommand Packet Information			
Packet Name	ZRND2301	Instrument	ROSINA
Packet Description	OD_READLEDA (D2_Function)		
Packet Function	Read DFMS LEDA detector and send science data to S/C		
Generation Rules			
Header Information			
Process ID	80	Packet Category	12
Service Type	196	Service Subtype	12
Structure ID		Packet length	30
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	OD_READLEDA	2 octet	Fixed field set to 1
PRNGD201	Number of cycles	4 octet	Contains 3 detailed parameters:
PRNDD220	Spare	2 octet	Not modifiable, set to 0
PRNDD221	Number of pre-cycles	4 bits	Default: 2
PRNDD222	Number of cycles	12 bits	Number of LEDA accumulation cycles
PRNGD202	Wait time and sci mode	4 octet	Contains 3 detailed parameters:
PRNDD223	Repetitive readout/Wait time	24 bits	0x8XXXXX + wait time in ms (0 = no repetition)
PRNDD225	Science mode	1 octet	Type of science packets
PRNGD203	Integration time	4 octet	LEDA integration time in ms for one cycle
PRNGD200	DFMS PAD-32 bits	4 octet	Not modifiable, set to 0.
Notes:			

Telecommand Packet Information			
Packet Name	ZRND2302	Instrument	ROSINA
Packet Description	OD_RESSCI (D2_Function)		
Packet Function	Reset DFMS science readout		
Generation Rules			
Header Information			
Process ID	80	Packet Category	12
Service Type	196	Service Subtype	12
Structure ID		Packet length	30
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	OD_RESSCI	2 octet	Fixed field set to 2
PRNGD200	DFMS PAD-32 bits	4 octet	Not modifiable, set to 0.
PRNGD200	DFMS PAD-32 bits	4 octet	Not modifiable, set to 0.
PRNGD200	DFMS PAD-32 bits	4 octet	Not modifiable, set to 0.
PRNGD200	DFMS PAD-32 bits	4 octet	Not modifiable, set to 0.
Notes: Internal use only. To be acknowledged manually by ground operators.			

Telecommand Packet Information			
Packet Name	<b>ZRND2303</b>	Instrument	ROSINA
Packet Description	OD_MCPINIT (D2_Function)		
Packet Function	Step up MCP high voltages from current value (normally 0) to the default value to activate the DFMS MCP detector.		
Generation Rules	<b>Controlled high vacuum (<math>&lt; 6 \times 10^{-7}</math> mbar) has to be inside DFMS.</b>		
Header Information			
Process ID	80	Packet Category	12
Service Type	196	Service Subtype	12
Structure ID		Packet length	30
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	Steps up MCP HVs	2 octet	Fixed field set to 3
PRNGD200	DFMS PAD-32 bits	4 octet	Not modifiable, set to 0.
PRNGD200	DFMS PAD-32 bits	4 octet	Not modifiable, set to 0.
PRNGD200	DFMS PAD-32 bits	4 octet	Not modifiable, set to 0.
PRNGD200	DFMS PAD-32 bits	4 octet	Not modifiable, set to 0.
Notes:			

Telecommand Packet Information			
Packet Name	<b>ZRND2304</b>	Instrument	ROSINA
Packet Description	OD_MCPDOWN (D2_Function)		
Packet Function	Step down MCP High Voltages from the current value to 0 to deactivate the DFMS MCP detector.		
Generation Rules	<b>Controlled high vacuum (<math>&lt; 6 \times 10^{-7}</math> mbar) has to be inside DFMS.</b>		
Header Information			
Process ID	80	Packet Category	12
Service Type	196	Service Subtype	12
Structure ID		Packet length	30
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	Steps down MCP HVs	2 octet	Fixed field set to 4
PRNGD200	DFMS PAD-32 bits	4 octet	Not modifiable, set to 0.
PRNGD200	DFMS PAD-32 bits	4 octet	Not modifiable, set to 0.
PRNGD200	DFMS PAD-32 bits	4 octet	Not modifiable, set to 0.
PRNGD200	DFMS PAD-32 bits	4 octet	Not modifiable, set to 0.
Notes:			

Telecommand Packet Information			
Packet Name	<b>ZRND2305</b>	Instrument	ROSINA
Packet Description	OD_GENHV Enable (D2_Function)		
Packet Function	Enable and set basic DFMS high voltages		
Generation Rules	<b>Controlled high vacuum (&lt; 6 x 10<sup>-7</sup> mbar) has to be inside DFMS.</b>		
Header Information			
Process ID	80	Packet Category	12
Service Type	196	Service Subtype	12
Structure ID		Packet length	30
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	HV + Fil Ops	2 octet	Fixed field set to 5
N/A	HV + Fil Enable	4 octet	Fixed field set to 1
PRNGD200	DFMS PAD-32 bits	4 octet	Not modifiable, set to 0.
PRNGD200	DFMS PAD-32 bits	4 octet	Not modifiable, set to 0.
PRNGD200	DFMS PAD-32 bits	4 octet	Not modifiable, set to 0.
Notes: Function clears HV_Safe bit and sets Cover_Disable bit.			

Telecommand Packet Information			
Packet Name	<b>ZRND2385</b>	Instrument	ROSINA
Packet Description	OD_GENHV Disable (D2_Function)		
Packet Function	Reset basic DFMS high voltages to 0 and disable them		
Generation Rules	<b>Controlled high vacuum (&lt; 6 x 10<sup>-7</sup> mbar) has to be inside DFMS.</b>		
Header Information			
Process ID	80	Packet Category	12
Service Type	196	Service Subtype	12
Structure ID		Packet length	30
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	HV + Fil Ops	2 octet	Fixed field set to 5
N/A	HV + Fil Disable	4 octet	Fixed field set to 14
PRNGD200	DFMS PAD-32 bits	4 octet	Not modifiable, set to 0.
PRNGD200	DFMS PAD-32 bits	4 octet	Not modifiable, set to 0.
PRNGD200	DFMS PAD-32 bits	4 octet	Not modifiable, set to 0.
Notes: Function clears HV_Safe bit and sets Cover_Disable bit.			

Telecommand Packet Information			
Packet Name	<b>ZRND2307</b>	Instrument	ROSINA
Packet Description	OD_GAINADJ (D2_Function)		
Packet Function	Start DFMS MCP gain adjustment (set optimal MCP HVs).		
Generation Rules	<b>Controlled high vacuum (&lt; 6 x 10<sup>-7</sup> mbar) has to be inside DFMS.</b>		
Header Information			
Process ID	80	Packet Category	12
Service Type	196	Service Subtype	12
Structure ID		Packet length	30
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	Steps down MCP HVs	2 octet	Fixed field set to 7
PRNGD200	DFMS PAD-32 bits	4 octet	Not modifiable, set to 0.
PRNGD200	DFMS PAD-32 bits	4 octet	Not modifiable, set to 0.
PRNGD200	DFMS PAD-32 bits	4 octet	Not modifiable, set to 0.
PRNGD200	DFMS PAD-32 bits	4 octet	Not modifiable, set to 0.
Notes: Internal use only. To be acknowledged manually by ground operators.			

Telecommand Packet Information			
Packet Name	ZRND23F8	Instrument	ROSINA
Packet Description	OD_COVER (D2_Function)		
Packet Function	Operate DFMS cover motor after pyro fired		
Generation Rules	<b>DO NOT USE ON GROUND!</b>		
Header Information			
Process ID	80	Packet Category	12
Service Type	196	Service Subtype	12
Structure ID		Packet length	30
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	DFMS Cover Ops	2 octet	Fixed field set to 8
PRNGD250	Cover motor parameter	4 octet	Contains 6 detailed parameters:
PRNDD228	Spare	4 bits	Not modifiable, set to 0
PRNDD229	Cover low voltage set	4 bits	Default: 2
PRNDD230	Cover acceleration	4 bits	Default: 1
PRNDD231	Cover brake	4 bits	Default: 7
PRNDD232	Cover min. speed	1 octet	Default: 4
PRNDD233	Cover max. speed	1 octet	Default: 1
PRNGD251	Cover action and mode	4 octet	Contains 5 detailed parameters:
PRNDD234	Spare	12 bits	Not modifiable, set to 0
PRNDD235	Cover action	1 octet	Calcurve CRNVD210 48 = Cover reset (open cover) 192 = Check last move complete 1 = Close cover to end switch 2 = Open cover to end switch 4 = Move cover to absolute Pos. (default) 8 = Move cover relative steps
PRNDD236	Cover mode	2 bits	Calcurve CRNVD211 0 = Micro step 1 = Nominal (default) 2 = Hall
PRNDD237	Cover direction	2 bits	Calcurve CRNVD212 0 = Close 2 = Open
PRNDD238	Cover position/steps	1 octet	Limit set LRND0238 Allowed range: 0 (open) – 160 (close), TBC
PRNGD200	DFMS PAD-32 bits	4 octet	Not modifiable, set to 0.
PRNGD200	DFMS PAD-32 bits	4 octet	Not modifiable, set to 0.
<p>Notes: SHALL NOT BE USED ON GROUND. For security, an enable command (ZRNR1002) has to be sent before the command will be accepted by DPU. To be acknowledged manually by ground operators.</p>			

Telecommand Packet Information			
Packet Name	<b>ZRND230A</b>	Instrument	ROSINA
Packet Description	OD_CEMSCAN (D2_Function)		
Packet Function	Setup all voltages for given mass (CEM/FC/LEDA), perform CEM/FC Scan, and send science data to S/C (CEM/FC).		
Generation Rules	<b>Controlled high vacuum (<math>&lt; 6 \times 10^{-7}</math> mbar) has to be inside DFMS.</b>		
Header Information			
Process ID	80	Packet Category	12
Service Type	196	Service Subtype	12
Structure ID		Packet length	30
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	CEM-LEDA-FC scan	2 octet	Fixed field set to 10
PRNGD204	Steps for noise readout	2 octet	Number of steps taken for background noise readout (default = 0)
PRNGD205	Mass Shift	2 octet	Shift for center of mass in 1/100 % (default = 0)
<i>PRNGD206</i>	<i>Scan Action</i>	<i>2 octet</i>	<i>Contains 4 detailed parameters:</i>
PRNDD201	D-Spare1	12 bits	Not modifiable, set to 0
PRNDD202	ESA/VACC Scan (only valid for high resolution)	1 bit	Calcurve CRNVD201 0 = VACCL Scan 1 = ESA Scan
PRNDD203	CEM/FC/LEDA selection	2 bits	Calcurve CRNVD202 0 = CEM 1 = LEDA 2 = FC
PRNDD204	High/Low Resolution	1 bit	Calcurve CRNVD203 0 = Low 1 = High
PRNGD207	CEM accumulation time	2 octet	Time in 0.513ms steps
PRNGD208	Mass	4 octet	Floating point
PRNGD209	Zoom	4 octet	Floating point (default = 1)
Notes: For LEDA MCP HVs have to be stepped up with command ZRND2303 before.			

Telecommand Packet Information			
Packet Name	<b>ZRND230B</b>	Instrument	ROSINA
Packet Description	OD_ABORT (D2_Function)		
Packet Function	Abort all DFMS functions.		
Generation Rules	<b>Emergency use only.</b>		
Header Information			
Process ID	80	Packet Category	12
Service Type	196	Service Subtype	12
Structure ID		Packet length	30
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	Abort functions	2 octet	Fixed field set to 11
PRNGD200	DFMS PAD-32 bits	4 octet	Not modifiable, set to 0.
PRNGD200	DFMS PAD-32 bits	4 octet	Not modifiable, set to 0.
PRNGD200	DFMS PAD-32 bits	4 octet	Not modifiable, set to 0.
PRNGD200	DFMS PAD-32 bits	4 octet	Not modifiable, set to 0.
Notes: Internal use only. To be acknowledged manually by ground operators.			

Telecommand Packet Information			
Packet Name	<b>ZRND230C</b>	Instrument	ROSINA
Packet Description	OD_FILA On (D2_Function)		
Packet Function	Setup all needed voltages and switch-on DFMS filament.		
Generation Rules	<b>Controlled high vacuum (&lt; 6 x 10<sup>-7</sup> mbar) has to be inside DFMS.</b>		
Header Information			
Process ID	80	Packet Category	12
Service Type	196	Service Subtype	12
Structure ID		Packet length	30
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	Filament Operation	2 octet	Fixed field set to 12
<i>PRNGD210</i>	<i>DFMS Filament Settings</i>	<i>4 octet</i>	<i>Contains 5 detailed parameters:</i>
PRNDD210	D-Spare2	24 bits	Not modifiable, set to 0
PRNDD211	Filament ON	4 bits	Not modifiable, set to 1
PRNDD212	D-Spare3	1 bit	Not modifiable, set to 0
PRNDD213	Filament emission	2 bits	Calcurve CRNVD205 0 = 2uA 1 = 20uA 2 = SUB 3 = 200uA
PRNDD214	Filament selection	1 bit	Calcurve CRNVD206 0 = Filament 1 1 = Filament 2
PRNGD200	DFMS PAD-32 bits	4 octet	Not modifiable, set to 0.
PRNGD200	DFMS PAD-32 bits	4 octet	Not modifiable, set to 0.
PRNGD200	DFMS PAD-32 bits	4 octet	Not modifiable, set to 0.
Notes:			

Telecommand Packet Information			
Packet Name	<b>ZRND238C</b>	Instrument	ROSINA
Packet Description	OD_FILA Off (D2_Function)		
Packet Function	Switch-off DFMS filament and reset voltages.		
Generation Rules	<b>Controlled high vacuum (&lt; 6 x 10<sup>-7</sup> mbar) has to be inside DFMS.</b>		
Header Information			
Process ID	80	Packet Category	12
Service Type	196	Service Subtype	12
Structure ID		Packet length	30
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	Filament Operation	2 octet	Fixed field set to 12
<i>PRNGD211</i>	<i>DFMS Filament Settings</i>	<i>4 octet</i>	<i>Contains 3 detailed parameters:</i>
PRNDD215	D-Spare2	24 bits	Not modifiable, set to 0
PRNDD216	Filament OFF	4 bits	Not modifiable, set to 14
PRNDD217	D-Spare4	4 bits	Not modifiable, set to 0
PRNGD200	DFMS PAD-32 bits	4 octet	Not modifiable, set to 0.
PRNGD200	DFMS PAD-32 bits	4 octet	Not modifiable, set to 0.
PRNGD200	DFMS PAD-32 bits	4 octet	Not modifiable, set to 0.
Notes:			



Telecommand Packet Information			
Packet Name	ZRND230D	Instrument	ROSINA
Packet Description	OD_RESETVOLT (D2_Function)		
Packet Function	Reset all scan voltages of DFMS used in function ZRND230A except MCP HVs.		
Generation Rules	<b>Controlled high vacuum (<math>&lt; 6 \times 10^{-7}</math> mbar) has to be inside DFMS.</b>		
Header Information			
Process ID	80	Packet Category	12
Service Type	196	Service Subtype	12
Structure ID		Packet length	30
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	Reset DFMS scan voltages	2 octet	Fixed field set to 13
PRNGD200	DFMS PAD-32 bits	4 octet	Not modifiable, set to 0.
PRNGD200	DFMS PAD-32 bits	4 octet	Not modifiable, set to 0.
PRNGD200	DFMS PAD-32 bits	4 octet	Not modifiable, set to 0.
PRNGD200	DFMS PAD-32 bits	4 octet	Not modifiable, set to 0.
Notes: To disable all HVs, function ZRND2385 has to be called afterwards			

### 3.2 RTOF

Type No.	Name	RSDB	Serv	Sub-serv	Param Count	Enable	Description
R1	R1_Direct	ZRNR1001	200	1	1	X	Direct RTOF Command
R2	R_Enable	ZRNR1002	200	2	2		Enable Critical Command
R10	R2_SetValue	ZRNR2001	200	10	4	X	Set & Verify Value
R11	R2_Execute	ZRNR2002	200	11	1		Execute single Command
R12	R2_Function	ZRNR2003	200	12	5		Call Function
R30	R3_Execute	ZRNR3001	200	30	1		Execute Sequence
R31	R3_Function	ZRNR3002	200	31	9		Call Function Sequence
R33	R3_Acquisition	ZRNR3004	200	33	5		Acquisition & Readout
R50	R4_Mode	ZRNR4001	200	50	8		Set & Operate single Mode
R52	R4_LoadLUT	ZRNR4003	200	52	5..79	X	Load Look Up Table
R53	R4_SetConv	ZRNR4004	200	53	16	X	Set Conversion Parameter
R55	R4_LoadMode	ZRNR4006	200	55	26	X	Load Mode Settings
R70	R5_Sequence	ZRNR5001	200	70	5		Measurement Sequence
R71	R5_LoadSeq	ZRNR5002	200	71	6..177	X	Load Sequence Table
R72	R5_Accumulate	ZRNR5003	200	72	5	X	Set Accu. Parameter

#### 3.2.1 ZRNR1001 (R1\_Direct)

Telecommand Packet Information			
Packet Name	<b>ZRNR1001</b>	Instrument	ROSINA
Packet Description	R1_Direct		
Packet Function	Any three byte low-level command can be sent directly to the RTOF (see RD[3] and sensor documentation)		
Generation Rules			
Header Information			
Process ID	80	Packet Category	12
Service Type	200	Service Subtype	01
Structure ID		Packet length	16
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
PRNGG101	Command	4 octet	Contains 2 detailed parameters:
PRNDG101	Spare	1 octet	Not modifiable, set to 0
PRNDG102	Sensor Command	3 octet	RTOF low-level command code
Notes: For security, an enable command (ZRNR1002) has to be sent before the direct command will be accepted by DPU. Internal use only.			

3.2.2 ZRNR1002 (R\_Enable)

Telecommand Packet Information			
Packet Name	<b>ZRNR1002</b>	Instrument	ROSINA
Packet Description	R_Enable		
Packet Function	Enable critical command (enable column marked in table 3.2)		
Generation Rules			
Header Information			
Process ID	80	Packet Category	12
Service Type	200	Service Subtype	02
Structure ID		Packet length	16
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
PRNGG102	Subservice	2 octet	Contains 2 detailed parameters:
PRNDG103	Spare	1 octet	Not modifiable, set to 0
PRNDG104	Subservice of critical cmd	1 octet	e.g. 1 for ZRNR1001
PRNGG103	Opcode of critical cmd	2 octet	First two bytes of parameters (e.g. spare 0 and first byte of sensor cmd for ZRNR1001)
Notes: One enable is valid until another enable command is sent.			

Telecommand Packet Information			
Packet Name	<b>ZRNR12F8</b>	Instrument	ROSINA
Packet Description	R_Enable OR COVER		
Packet Function	Enable RTOF cover command		
Generation Rules			
Header Information			
Process ID	80	Packet Category	12
Service Type	200	Service Subtype	02
Structure ID		Packet length	16
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	Subservice of cover cmd	2 octet	Fixed field set to 12
N/A	Opcode of cover cmd	2 octet	Fixed field set to 8
Notes: One enable is valid until another enable command is sent.			

Telecommand Packet Information			
Packet Name	<b>ZRNR1201</b>	Instrument	ROSINA
Packet Description	R_Enable SetValue		
Packet Function	Enable RTOF SetValue command		
Generation Rules			
Header Information			
Process ID	80	Packet Category	12
Service Type	200	Service Subtype	02
Structure ID		Packet length	16
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	Subservice of cmd	2 octet	Fixed field set to 10
PRNGR101	Set Voltage No.	2 octet	Calcurve CRNVR101: 40V = 1 70V = 2 BP_G = 3 BP_I = 4 E2_I = 5 ELA_I = 6 ELB_I = 7 GR_G = 8 GR_I = 9 P_I = 10 P_G = 11 HM2 = 12 HM3 = 13 M_G = 14 M_I = 15 A1_G = 16 A1_I = 17 A2_G = 18 A2_I = 19 D = 20 HM1 = 21 HML = 22 R1 = 23 R2 = 24 RL = 25 SL_G = 26 SL_I = 27 FIL_G = 28 FIL_I = 29 REPA_G = 30 REPA_I = 31 REPB_G = 32 REPB_I = 33 TRAP = 34 ENT1_I = 35 EC1_G = 36 EC1_I = 37 EH1_G = 38 EH1_I = 39 MCC_I = 40 MCC_G = 41 HMPW = 42 HMPD = 43
Notes: One enable is valid until another enable command is sent.			

## 3.2.3 ZRNR2001 (R2\_SetValue)

Telecommand Packet Information			
Packet Name	<b>ZRNR2001</b>	Instrument	ROSINA
Packet Description	R2_SetValue		
Packet Function	Set any RTOF internal voltage or parameter with the DPU general voltage set function (taking into account required stepping and monitoring, e.g. RTOF Drift)		
Generation Rules			
Header Information			
Process ID	80	Packet Category	12
Service Type	200	Service Subtype	10
Structure ID		Packet length	22
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
PRNGG201	Parameter No.	2 octet	Entry of set parameter in DPU cmd conversion table
PRNGG202	Parameter Value	4 octet	Set value in floating point
PRNGG203	Wait time in ms	2 octet	Optional wait time for HK monitoring after cmd was sent
PRNGG204	Monitoring No.	2 octet	Optional entry of related HK parameter in DPU monitoring table
Notes: Optional parameters will overwrite existing DPU internal parameters. For security, an enable command (ZRNR1002) has to be sent before the command will be accepted by DPU. Internal use only.			

Telecommand Packet Information			
Packet Name	<b>ZRNR2100</b>	Instrument	ROSINA
Packet Description	R2_SetValue RTOF Voltage		
Packet Function	Set predefined RTOF internal voltages with the DPU general voltage set function (taking into account required stepping and monitoring)		
Generation Rules			
Header Information			
Process ID	80	Packet Category	12
Service Type	200	Service Subtype	10
Structure ID		Packet length	22
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
PRNGR101	Set Voltage No.	2 octet	Calcurve CRNVR101: 40V = 1 70V = 2 BP_G = 3 BP_I = 4 E2_I = 5 ELA_I = 6 ELB_I = 7 GR_G = 8 GR_I = 9 P_I = 10 P_G = 11 HM2 = 12 HM3 = 13 M_G = 14 M_I = 15 A1_G = 16 A1_I = 17 A2_G = 18 A2_I = 19 D = 20 HM1 = 21 HML = 22 R1 = 23 R2 = 24 RL = 25 SL_G = 26 SL_I = 27 FIL_G = 28 FIL_I = 29 REPA_G = 30 REPA_I = 31 REPB_G = 32 REPB_I = 33 TRAP = 34 ENT1_I = 35 EC1_G = 36 EC1_I = 37 EH1_G = 38 EH1_I = 39 MCC_I = 40 MCC_G = 41 HMPW = 42 HMPD = 43
PRNGR102	Voltage Value	4 octet	Set value in floating point
N/A	Wait time in ms	2 octet	Fixed field set to 0

N/A	Monitorinr.No.	2 octet	Fixed field set to 0
Notes: For security, an enable command (ZRNR1002) has to be sent before the command will be accepted by DPU. Internal use only.			

## 3.2.4 ZRNR2002 (R2\_Execute)

Telecommand Packet Information			
Packet Name	<b>ZRNR2200</b>	Instrument	ROSINA
Packet Description	R2_Init (R2_Execute)		
Packet Function	Set all RTOF voltages to initial values		
Generation Rules			
Header Information			
Process ID	80	Packet Category	12
Service Type	200	Service Subtype	11
Structure ID		Packet length	14
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	R2_Init	2 octet	Fixed field set to 0
Notes:			

Telecommand Packet Information			
Packet Name	<b>ZRNR2206</b>	Instrument	ROSINA
Packet Description	R2_ETS_10k (R2_Execute)		
Packet Function	Mode 1 is the default ETS mode (pulser frequency: 10kHz).		
Generation Rules	Use only after ETS is switched on		
Header Information			
Process ID	80	Packet Category	12
Service Type	200	Service Subtype	11
Structure ID		Packet length	14
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	R2_ETS_10k	2 octet	Fixed field set to 6
Notes:			

Telecommand Packet Information			
Packet Name	<b>ZRNR2207</b>	Instrument	ROSINA
Packet Description	R2_ETS_GAS (R2_Execute)		
Packet Function	Set ETS to gas mode		
Generation Rules	Use only after ETS is switched on		
Header Information			
Process ID	80	Packet Category	12
Service Type	200	Service Subtype	11
Structure ID		Packet length	14
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	R2_ETS_GAS	2 octet	Fixed field set to 7
Notes: First setup ETS general mode (e.g. mode 1 with command ZRNR2206).			



Telecommand Packet Information			
Packet Name	<b>ZRNR2208</b>	Instrument	ROSINA
Packet Description	R2_ETS_ION (R2_Execute)		
Packet Function	Set ETS to ion mode		
Generation Rules	Use only after ETS is switched on		
Header Information			
Process ID	80	Packet Category	12
Service Type	200	Service Subtype	11
Structure ID		Packet length	14
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	R2_ETS_ION	2 octet	Fixed field set to 8
Notes: First setup ETS general mode (e.g. mode 1 with command ZRNR2206).			

Telecommand Packet Information			
Packet Name	<b>ZRNR2209</b>	Instrument	ROSINA
Packet Description	R2_ETS_CAL (R2_Execute)		
Packet Function	Set ETS to calibration mode		
Generation Rules	Use only after ETS is switched on		
Header Information			
Process ID	80	Packet Category	12
Service Type	200	Service Subtype	11
Structure ID		Packet length	14
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	R2_ETS_CAL	2 octet	Fixed field set to 9
Notes: First setup ETS general mode (e.g. mode 1 with command ZRNR2206).			

Telecommand Packet Information			
Packet Name	<b>ZRNR220E</b>	Instrument	ROSINA
Packet Description	R2_HEAT_ION (R2_Execute)		
Packet Function	Switch on ion source heater to clean it.		
Generation Rules	<b>Controlled high vacuum (&lt; 6 x 10<sup>-7</sup> mbar) has to be inside RTOF.</b>		
Header Information			
Process ID	80	Packet Category	12
Service Type	200	Service Subtype	11
Structure ID		Packet length	14
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	R2_HEAT_ION	2 octet	Fixed field set to 14
Notes:			

Telecommand Packet Information			
Packet Name	<b>ZRNR220F</b>	Instrument	ROSINA
Packet Description	R2_HEAT_GAS (R2_Execute)		
Packet Function	Switch on gas source heater.		
Generation Rules	<b>Controlled high vacuum (&lt; 6 x 10<sup>-7</sup> mbar) has to be inside RTOF.</b>		
Header Information			
Process ID	80	Packet Category	12
Service Type	200	Service Subtype	11
Structure ID		Packet length	14
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	R2_HEAT_GAS	2 octet	Fixed field set to 15
Notes:			

Telecommand Packet Information			
Packet Name	<b>ZRNR2210</b>	Instrument	ROSINA
Packet Description	R2_HEAT_OFF (R2_Execute)		
Packet Function	Switch off all heaters		
Generation Rules	<b>Controlled high vacuum (&lt; 6 x 10<sup>-7</sup> mbar) has to be inside RTOF.</b>		
Header Information			
Process ID	80	Packet Category	12
Service Type	200	Service Subtype	11
Structure ID		Packet length	14
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	R2_HEAT_OFF	2 octet	Fixed field set to 16
Notes:			

Telecommand Packet Information			
Packet Name	<b>ZRNR2211</b>	Instrument	ROSINA
Packet Description	R2_ETL_10k (R2_Execute)		
Packet Function	Mode 1 is the default ETS Light mode (pulser frequency: 10kHz).		
Generation Rules	Use only after ETSL is switched on		
Header Information			
Process ID	80	Packet Category	12
Service Type	200	Service Subtype	11
Structure ID		Packet length	14
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	R2_ETL_10k	2 octet	Fixed field set to 17
Notes:			

Telecommand Packet Information			
Packet Name	<b>ZRNR2212</b>	Instrument	ROSINA
Packet Description	R2_ETL_GAS (R2_Execute)		
Packet Function	Set ETS Light to gas mode		
Generation Rules	Use only after ETSL is switched on		
Header Information			
Process ID	80	Packet Category	12

Service Type	200	Service Subtype	11
Structure ID		Packet length	14
<b>Data Field Information</b>			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	R2_ETL_GAS	2 octet	Fixed field set to 18
Notes: First setup ETSL general mode (e.g. mode 1 with command ZRNR2211).			

<b>Telecommand Packet Information</b>			
Packet Name	<b>ZRNR2213</b>	Instrument	ROSINA
Packet Description	R2_ETL_ION (R2_Execute)		
Packet Function	Set ETS Light to ion mode		
Generation Rules	Use only after ETSL is switched on		
<b>Header Information</b>			
Process ID	80	Packet Category	12
Service Type	200	Service Subtype	11
Structure ID		Packet length	14
<b>Data Field Information</b>			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	R2_ETL_ION	2 octet	Fixed field set to 19
Notes: First setup ETSL general mode (e.g. mode 1 with command ZRNR2211).			

<b>Telecommand Packet Information</b>			
Packet Name	<b>ZRNR221B</b>	Instrument	ROSINA
Packet Description	R2_ETL_CAL (R2_Execute)		
Packet Function	Set ETS Light to calibration mode		
Generation Rules	Use only after ETSL is switched on		
<b>Header Information</b>			
Process ID	80	Packet Category	12
Service Type	200	Service Subtype	11
Structure ID		Packet length	14
<b>Data Field Information</b>			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	R2_ETL_CAL	2 octet	Fixed field set to 27
Notes: First setup ETSL general mode (e.g. mode 1 with command ZRNR2211).			

<b>Telecommand Packet Information</b>			
Packet Name	<b>ZRNR221C</b>	Instrument	ROSINA
Packet Description	R2_HMP_ON (R2_Execute)		
Packet Function	Switch on hard mirror pulser		
Generation Rules			
<b>Header Information</b>			
Process ID	80	Packet Category	12
Service Type	200	Service Subtype	11
Structure ID		Packet length	14
<b>Data Field Information</b>			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	R2_HMP_ON	2 octet	Fixed field set to 28
Notes:			

## 3.2.5 ZRNR2003 (R2\_Function)

Telecommand Packet Information			
Packet Name	<b>ZRNR2303</b>	Instrument	ROSINA
Packet Description	OR_PULSER On (R2_Function)		
Packet Function	Set all needed voltages and enable pulser		
Generation Rules	<b>Controlled high vacuum (&lt; 6 x 10<sup>-7</sup> mbar) has to be inside RTOF.</b>		
Header Information			
Process ID	80	Packet Category	12
Service Type	200	Service Subtype	12
Structure ID		Packet length	30
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	OR_PULSER	2 octet	Fixed field set to 3
PRNGR201	<i>Pulser on settings</i>	4 octet	<i>Contains 4 detailed parameters:</i>
PRNDR201	R-Spare1	24 bits	Not modifiable, set to 0
PRNDR202	Switch ON	4 bits	Not modifiable, set to 1
PRNDR203	Pulser table	3 bits	Calcurve CRNVR202 0 = Test 1 = SRSS (single refl, storage src) 2 = TRSS (triple refl, storage src) 3 = SROS (single refl, orthogonal src)
PRNDR204	Select pulser on	1 bit	Calcurve CRNVR201 0 = Gas 1 = Ion
PRNGR200	RTOF PAD-32 bits	4 octet	Not modifiable, set to 0
PRNGR200	RTOF PAD-32 bits	4 octet	Not modifiable, set to 0
PRNGR200	RTOF PAD-32 bits	4 octet	Not modifiable, set to 0
Notes:			

Telecommand Packet Information			
Packet Name	<b>ZRNR2383</b>	Instrument	ROSINA
Packet Description	OR_PULSER Off (R2_Function)		
Packet Function	Disable pulser and reset all voltages		
Generation Rules	<b>Controlled high vacuum (&lt; 6 x 10<sup>-7</sup> mbar) has to be inside RTOF.</b>		
Header Information			
Process ID	80	Packet Category	12
Service Type	200	Service Subtype	12
Structure ID		Packet length	30
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	OR_PULSER	2 octet	Fixed field set to 3
PRNGR202	<i>Pulser off settings</i>	4 octet	<i>Contains 4 detailed parameters:</i>
PRNDR205	R-Spare1	24 bits	Not modifiable, set to 0
PRNDR206	Switch OFF	4 bits	Not modifiable, set to 14
PRNDR207	Spare	3 bits	Not modifiable, set to 0
PRNDR208	Select pulser off	1 bit	Calcurve CRNVR201 0 = Gas 1 = Ion
PRNGR200	RTOF PAD-32 bits	4 octet	Not modifiable, set to 0
PRNGR200	RTOF PAD-32 bits	4 octet	Not modifiable, set to 0
PRNGR200	RTOF PAD-32 bits	4 octet	Not modifiable, set to 0
Notes:			

Telecommand Packet Information			
Packet Name	<b>ZRNR2304</b>	Instrument	ROSINA
Packet Description	OR_ETSPOW On (R2_Function)		
Packet Function	Switch power of ETS/ETS light on		
Generation Rules			
Header Information			
Process ID	80	Packet Category	12
Service Type	200	Service Subtype	12
Structure ID		Packet length	30
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	OR_ETSPOW	2 octet	Fixed field set to 4
PRNGR210	ETS Power on settings	4 octet	Contains 3 detailed parameters:
PRNDR240	R-Spare1	24 bits	Not modifiable, set to 0
PRNDR241	Switch ETS ON	4 bits	Not modifiable, set to 1
PRNDR242	ETS ON Unit Selection	4 bits	Calcurve CRNVR203 0 = ETS 1 = ETS light
PRNGR200	RTOF PAD-32 bits	4 octet	Not modifiable, set to 0
PRNGR200	RTOF PAD-32 bits	4 octet	Not modifiable, set to 0
PRNGR200	RTOF PAD-32 bits	4 octet	Not modifiable, set to 0
Notes:			

Telecommand Packet Information			
Packet Name	<b>ZRNR2384</b>	Instrument	ROSINA
Packet Description	OR_ETSPOW Off (R2_Function)		
Packet Function	Switch power of ETS/ETS light off		
Generation Rules			
Header Information			
Process ID	80	Packet Category	12
Service Type	200	Service Subtype	12
Structure ID		Packet length	30
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	OR_ETSPOW	2 octet	Fixed field set to 4
PRNGR211	ETS Power off settings	4 octet	Contains 3 detailed parameters:
PRNDR201	R-Spare1	24 bits	Not modifiable, set to 0
PRNDR205	Switch ETS OFF	4 bits	Not modifiable, set to 14
PRNDR207	ETS OFF Unit Selection	4 bits	Calcurve CRNVR203 0 = ETS 1 = ETS light
PRNGR200	RTOF PAD-32 bits	4 octet	Not modifiable, set to 0
PRNGR200	RTOF PAD-32 bits	4 octet	Not modifiable, set to 0
PRNGR200	RTOF PAD-32 bits	4 octet	Not modifiable, set to 0
Notes:			

Telecommand Packet Information			
Packet Name	<b>ZRNR2305</b>	Instrument	ROSINA
Packet Description	OR_FILA On (R2_Function)		
Packet Function	Setup all needed voltages and enable filament		
Generation Rules	<b>Controlled high vacuum (&lt; 6 x 10<sup>-7</sup> mbar) has to be inside RTOF.</b>		
Header Information			
Process ID	80	Packet Category	12
Service Type	200	Service Subtype	12
Structure ID		Packet length	30
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	OR_FILA	2 octet	Fixed field set to 5
PRNGR204	<i>RTOF Filament ON Settings</i>	4 octet	<i>Contains 5 detailed parameters:</i>
PRNDR210	R-Spare1	24 bits	Not modifiable, set to 0
PRNDR211	R-Filament ON	4 bits	Not modifiable, set to 1
PRNDR212	R-Spare4	2 bits	Not modifiable, set to 0
PRNDR213	Filament ON Ion/Gas	1 bit	Calcurve CRNVR206 0 = Gas 1 = Ion
PRNDR214	Filament on selection	1 bit	Calcurve CRNVR207 0 = Filament 1 1 = Filament 2
PRNGR200	RTOF PAD-32 bits	4 octet	Not modifiable, set to 0
PRNGR205	Set emission current	4 octet	Set current in $\mu$ A (floating point)
PRNGR200	RTOF PAD-32 bits	4 octet	Not modifiable, set to 0
Notes:			

Telecommand Packet Information			
Packet Name	<b>ZRNR2385</b>	Instrument	ROSINA
Packet Description	OR_FILA Off (R2_Function)		
Packet Function	Disable filament and reset all needed voltages		
Generation Rules	<b>Controlled high vacuum (&lt; 6 x 10<sup>-7</sup> mbar) has to be inside RTOF.</b>		
Header Information			
Process ID	80	Packet Category	12
Service Type	200	Service Subtype	12
Structure ID		Packet length	30
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	OR_FILA	2 octet	Fixed field set to 5
PRNGR212	<i>RTOF Filament Off Settings</i>	4 octet	<i>Contains 5 detailed parameters:</i>
PRNDR246	R-Spare1	24 bits	Not modifiable, set to 0
PRNDR247	R-Filament OFF	4 bits	Not modifiable, set to 14
PRNDR248	R-Spare4	2 bits	Not modifiable, set to 0
PRNDR249	Filament OFF Ion/Gas	1 bit	Calcurve CRNVR206 0 = Gas 1 = Ion
PRNDR250	Spare	1 bit	Not modifiable, set to 0
PRNGR200	RTOF PAD-32 bits	4 octet	Not modifiable, set to 0
PRNGR200	RTOF PAD-32 bits	4 octet	Not modifiable, set to 0
PRNGR200	RTOF PAD-32 bits	4 octet	Not modifiable, set to 0
Notes:			

Telecommand Packet Information			
Packet Name	<b>ZRNR2306</b>	Instrument	ROSINA
Packet Description	OR_READETS (R2_Function)		
Packet Function	Start ETS acquisition, readout and send science data to S/C		
Generation Rules	Use only after ETS is switched on		
Header Information			
Process ID	80	Packet Category	12
Service Type	200	Service Subtype	12
Structure ID		Packet length	30
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	Read ETS	2 octet	Fixed field set to 6
PRNGR203	ETS acquisition time	4 octet	Time between start acquisition and readout in ms
<i>PRNGR213</i>	<i>ETS readout settings</i>	<i>4 octet</i>	<i>Contains 3 detailed parameters:</i>
PRNDR243	R-Spare1	24 bits	Not modifiable, set to 0
PRNDR244	Spare	4 bits	Not modifiable, set to 0
PRNDR245	ETS Read Unit Selection	4 bits	Calcurve CRNVR203 0 = ETS 1 = ETS light
PRNGR200	RTOF PAD-32 bits	4 octet	Not modifiable, set to 0
PRNGR200	RTOF PAD-32 bits	4 octet	Not modifiable, set to 0
Notes:			

Telecommand Packet Information			
Packet Name	<b>ZRNR2307</b>	Instrument	ROSINA
Packet Description	OR_ABORT (R2_Function)		
Packet Function	Abort all RTOF functions.		
Generation Rules	<b>Emergency use only.</b>		
Header Information			
Process ID	80	Packet Category	12
Service Type	200	Service Subtype	12
Structure ID		Packet length	30
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	Abort functions	2 octet	Fixed field set to 7
PRNGR200	RTOF PAD-32 bits	4 octet	Not modifiable, set to 0.
PRNGR200	RTOF PAD-32 bits	4 octet	Not modifiable, set to 0.
PRNGR200	RTOF PAD-32 bits	4 octet	Not modifiable, set to 0.
PRNGR200	RTOF PAD-32 bits	4 octet	Not modifiable, set to 0.
Notes: Internal use only. To be acknowledged manually by ground operators.			

Telecommand Packet Information			
Packet Name	ZRNR23F8	Instrument	ROSINA
Packet Description	OR_COVER (R2_Function)		
Packet Function	Operate RTOF cover motor after pyro fired		
Generation Rules	<b>DO NOT USE ON GROUND!</b>		
Header Information			
Process ID	80	Packet Category	12
Service Type	200	Service Subtype	12
Structure ID		Packet length	30
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	RTOF Cover Ops	2 octet	Fixed field set to 8
PRNGR252	RTOF PAD-16 bits	2 octet	Not modifiable, set to 0.
<i>PRNGR250</i>	<i>RTOF Cover motor power</i>	<i>2 octet</i>	<i>Contains 7 detailed parameters:</i>
PRNDR250	R-Spare4	2 bits	Not modifiable, set to 0
PRNDR251	Motor velocity	2 bits	Calcurve CRNVR220 0 = 5 Hz 1 = 10 Hz 2 = 20 Hz 3 = 40 Hz
PRNDR252	Spare	4 bits	Not modifiable, set to 0
PRNDR253	Motor hall sensor	2 bits	Calcurve CRNVR221 1 = Off 2 = On
PRNDR254	Direct open/close	2 bits	Calcurve CRNVR222 0 = Move 1 = Close cover to end switch 2 = Open cover to end switch
PRNDR255	R-Spare4	2 bits	Not modifiable, set to 0
PRNDR256	Motor high torque	2 bits	Calcurve CRNVR221 1 = Off 2 = On
PRNGR253	RTOF PAD-16 bits	2 octet	Not modifiable, set to 0.
<i>PRNGR251</i>	<i>RTOF cover action</i>	<i>2 octet</i>	<i>Contains 2 detailed parameters:</i>
PRNDR257	Cover command	1 octet	Calcurve CRNVR223 0 = Move cover to absolute Pos. (default) 1 = Move cover relative steps 6 = Cover reset (open cover) 24 = Check last move complete
PRNDR258	Cover position/steps	1 octet	Limit Set LRNR0258 Allowed range: 0 (open) – 20 (close), TBC
PRNGR200	RTOF PAD-32 bits	4 octet	Not modifiable, set to 0.
PRNGR200	RTOF PAD-32 bits	4 octet	Not modifiable, set to 0.
<p>Notes: SHALL NOT BE USED ON GROUND. For security, an enable command (ZRNR1002) has to be sent before the command will be accepted by DPU. To be acknowledged manually by ground operators.</p>			



Telecommand Packet Information			
Packet Name	ZRNR230A	Instrument	ROSINA
Packet Description	OR_HVUP (R2_Function)		
Packet Function	Step up all RTOF high voltages except MCP.		
Generation Rules	<b>Controlled high vacuum (&lt; 6 x 10<sup>-7</sup> mbar) has to be inside RTOF.</b>		
Header Information			
Process ID	80	Packet Category	12
Service Type	200	Service Subtype	12
Structure ID		Packet length	30
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	OR_HVUP	2 octet	Fixed field set to 10
PRNGR206	RTOF HV Up settings	4 octet	Contains 5 detailed parameters:
PRNDR220	R-Spare1	24 bits	Not modifiable, set to 0
PRNDR221	Spare	3 bits	Not modifiable, set to 0
PRNDR222	R-HV Up Include hard mirror pulser	1 bit	Calcurve CRNVR208 0 = Off 1 = On
PRNDR223	RTOF HV Up table	3 bits	Calcurve CRNVR202 0 = Test 1 = SRSS (single refl, storage src) 2 = TRSS (triple refl, storage src) 3 = SROS (single refl, orthogonal src)
PRNDR224	RTOF HV Uplon/Gas	1 bit	Calcurve CRNVR201 0 = Gas 1 = Ion
PRNGR200	RTOF PAD-32 bits	4 octet	Not modifiable, set to 0
PRNGR200	RTOF PAD-32 bits	4 octet	Not modifiable, set to 0
PRNGR200	RTOF PAD-32 bits	4 octet	Not modifiable, set to 0
Notes:			

Telecommand Packet Information			
Packet Name	<b>ZRNR230B</b>	Instrument	ROSINA
Packet Description	OR_HVDOWN (R2_Function)		
Packet Function	Step down all RTOF high voltages to init values, except MCP.		
Generation Rules	<b>Controlled high vacuum (&lt; 6 x 10<sup>-7</sup> mbar) has to be inside RTOF.</b>		
Header Information			
Process ID	80	Packet Category	12
Service Type	200	Service Subtype	12
Structure ID		Packet length	30
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	OR_HVDOWN	2 octet	Fixed field set to 11
PRNGR207	RTOF HV Down settings	4 octet	Contains 6 detailed parameters:
PRNDR225	R-Spare1	24 bits	Not modifiable, set to 0
PRNDR226	Spare	3 bits	Not modifiable, set to 0
PRNDR227	R-HV Down Include hard mirror pulser	1 bit	Calcurve CRNVR208 0 = Off 1 = On
PRNDR228	R-Spare4	2 bits	Not modifiable, set to 0
PRNDR229	RTOF Common HV Off	1 bit	Calcurve CRNVR212 0 = Keep On 1 = All Off
PRNDR230	RTOF HV Down Ion/Gas	1 bit	Calcurve CRNVR201 0 = Gas 1 = Ion
PRNGR200	RTOF PAD-32 bits	4 octet	Not modifiable, set to 0
PRNGR200	RTOF PAD-32 bits	4 octet	Not modifiable, set to 0
PRNGR200	RTOF PAD-32 bits	4 octet	Not modifiable, set to 0
Notes:			

Telecommand Packet Information			
Packet Name	<b>ZRNR230C</b>	Instrument	ROSINA
Packet Description	OR_MCP On (R2_Function)		
Packet Function	Step up RTOF MCP high voltage		
Generation Rules	<b>Controlled high vacuum (<math>&lt; 6 \times 10^{-7}</math> mbar) has to be inside RTOF.</b>		
Header Information			
Process ID	80	Packet Category	12
Service Type	200	Service Subtype	12
Structure ID		Packet length	30
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	OR_MCP	2 octet	Fixed field set to 12
PRNGR208	RTOF MCP HV Up settings	4 octet	Contains 4 detailed parameters:
PRNDR231	R-Spare1	24 bits	Not modifiable, set to 0
PRNDR232	Spare	4 bits	Not modifiable, set to 0
PRNDR233	RTOF MCP HV Up table	3 bits	Calcurve CRNVR202 0 = Test 1 = SRSS (single refl, storage src) 2 = TRSS (triple refl, storage src) 3 = SROS (single refl, orthogonal src)
PRNDR234	RTOF MCP HV Up Ion/Gas	1 bit	Calcurve CRNVR201 0 = Gas 1 = Ion
PRNGR200	RTOF PAD-32 bits	4 octet	Not modifiable, set to 0
PRNGR200	RTOF PAD-32 bits	4 octet	Not modifiable, set to 0
PRNGR200	RTOF PAD-32 bits	4 octet	Not modifiable, set to 0
Notes:			

Telecommand Packet Information			
Packet Name	<b>ZRNR238C</b>	Instrument	ROSINA
Packet Description	OR_MCP Off (R2_Function)		
Packet Function	Step down RTOF MCP high voltage		
Generation Rules	<b>Controlled high vacuum (<math>&lt; 6 \times 10^{-7}</math> mbar) has to be inside RTOF.</b>		
Header Information			
Process ID	80	Packet Category	12
Service Type	200	Service Subtype	12
Structure ID		Packet length	30
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	OR_MCP	2 octet	Fixed field set to 12
PRNGR209	MCP HV down settings	4 octet	Contains 4 detailed parameters:
PRNDR235	R-Spare1	24 bits	Not modifiable, set to 0
PRNDR236	Spare	4 bits	Not modifiable, set to 0
PRNDR237	Spare	3 bits	Not modifiable, set to 0
PRNDR238	RTOF MCP HV Down Ion/Gas	1 bit	Calcurve CRNVR201 0 = Gas 1 = Ion
PRNGR200	RTOF PAD-32 bits	4 octet	Not modifiable, set to 0
PRNGR200	RTOF PAD-32 bits	4 octet	Not modifiable, set to 0
PRNGR200	RTOF PAD-32 bits	4 octet	Not modifiable, set to 0
Notes:			

### 3.3 COPS

Type No.	Name	RSDB	Serv	Sub-serv	Param Count	Enable	Description
C1	C1_Direct	ZRNC1001	204	1	1	X	Direct COPS Command
C2	C_Enable	ZRNC1002	204	2	2		Enable Critical Command
C10	C2_SetValue	ZRNC2001	204	10	4	X	Set & Verify Value
C11	C2_Execute	ZRNC2002	204	11	1		Execute single Command
C12	C2_Function	ZRNC2003	204	12	5		Call Function
C30	C3_Execute	ZRNC3001	204	30	1		Execute Sequence
C31	C3_Function	ZRNC3002	204	31	9		Call Function Sequence
C50	C4_Mode	ZRNC4001	204	50	8		Set & Operate single Mode
C52	C4_LoadLUT	ZRNC4003	204	52	5..79	X	Load Look Up Table
C53	C4_SetConv	ZRNC4004	204	53	16	X	Set Conversion Parameter
C55	C4_LoadMode	ZRNC4006	204	55	26	X	Load Mode Settings

#### 3.3.1 ZRNC1001 (C1\_Direct)

Telecommand Packet Information			
Packet Name	ZRNC1001	Instrument	ROSINA
Packet Description	C1_Direct		
Packet Function	Any three byte low-level command can be sent directly to the COPS (see RD[3] and sensor documentation)		
Generation Rules			
Header Information			
Process ID	80	Packet Category	12
Service Type	204	Service Subtype	01
Structure ID		Packet length	16
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
PRNGG101	Command	4 octet	Contains 2 detailed parameters:
PRNDG101	Spare	1 octet	Not modifiable, set to 0
PRNDG102	Sensor Command	3 octet	COPS low-level command code
Notes: For security, an enable command (ZRNC1002) has to be sent before the direct command will be accepted by DPU. Internal use only.			

## 3.3.2 ZRNC1002 (C\_Enable)

Telecommand Packet Information			
Packet Name	<b>ZRNC1002</b>	Instrument	ROSINA
Packet Description	C_Enable		
Packet Function	Enable critical command (enable column marked in table 3.3)		
Generation Rules			
Header Information			
Process ID	80	Packet Category	12
Service Type	204	Service Subtype	02
Structure ID		Packet length	16
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
PRNGG102	Subservice	2 octet	Contains 2 detailed parameters:
PRNDG103	Spare	1 octet	Not modifiable, set to 0
PRNDG104	Subservice of critical cmd	1 octet	e.g. 1 for ZRNC1001
PRNGG103	Opcode of critical cmd	2 octet	First two bytes of parameters (e.g. spare 0 and first byte of sensor cmd for ZRNC1001)
Notes: One enable is valid until another enable command is sent.			

Telecommand Packet Information			
Packet Name	<b>ZRNC1201</b>	Instrument	ROSINA
Packet Description	C_Enable SetValue		
Packet Function	Enable COPS SetValue command		
Generation Rules			
Header Information			
Process ID	80	Packet Category	12
Service Type	204	Service Subtype	02
Structure ID		Packet length	16
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	Subservice of cmd	2 octet	Fixed field set to 10
PRNGC101	Set Voltage No.	2 octet	Calcurve CRNVC101: GRIDFIL = 1 REGFIL = 2 CURFIL = 3 GRIDMT = 4 REGMT = 5 CURMT = 6
Notes: One enable is valid until another enable command is sent.			

3.3.3 ZRNC2001 (C2\_SetValue)

Telecommand Packet Information			
Packet Name	ZRNC2001	Instrument	ROSINA
Packet Description	C2_SetValue		
Packet Function	Set any COPS internal voltage or parameter with the DPU general voltage set function (taking into account required stepping and monitoring, e.g. COPS grid voltage)		
Generation Rules			
Header Information			
Process ID	80	Packet Category	12
Service Type	204	Service Subtype	10
Structure ID		Packet length	22
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
PRNGG201	Parameter No.	2 octet	Entry of set parameter in DPU cmd conversion table
PRNGG202	Parameter Value	4 octet	Set value in floating point
PRNGG203	Wait time in ms	2 octet	Optional wait time for HK monitoring after cmd was sent
PRNGG204	Monitoring No.	2 octet	Optional entry of related HK parameter in DPU monitoring table
Notes: Optional parameters will overwrite existing DPU internal parameters. For security, an enable command (ZRNC1002) has to be sent before the command will be accepted by DPU. Internal use only.			

Telecommand Packet Information			
Packet Name	ZRNC2100	Instrument	ROSINA
Packet Description	C2_SetValue Voltages		
Packet Function	Set predefined COPS internal voltages with the DPU general voltage set function (taking into account required stepping and monitoring)		
Generation Rules			
Header Information			
Process ID	80	Packet Category	12
Service Type	204	Service Subtype	10
Structure ID		Packet length	22
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
PRNGC101	Set Voltage No.	2 octet	Calcurve CRNVC101: GRIDFIL = 1 REGFIL = 2 CURFIL = 3 GRIDMT = 4 REGMT = 5 CURMT = 6
PRNGC102	Voltage Value	4 octet	Set value in floating point
N/A	Wait time in ms	2 octet	Fixed field set to 0
N/A	Monitoring No.	2 octet	Fixed field set to 0
Notes: For security, an enable command (ZRNC1002) has to be sent before the command will be accepted by DPU. Internal use only.			

3.3.4 ZRNC2002 (C2\_Execute)

Telecommand Packet Information			
Packet Name	<b>ZRNC2200</b>	Instrument	ROSINA
Packet Description	C2_Init (C2_Execute)		
Packet Function	Set all COPS voltages to initial values		
Generation Rules			
Header Information			
Process ID	80	Packet Category	12
Service Type	204	Service Subtype	11
Structure ID		Packet length	14
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	C2_Init	2 octet	Fixed field set to 0
Notes:			

Telecommand Packet Information			
Packet Name	<b>ZRNC2201</b>	Instrument	ROSINA
Packet Description	C2_NGOFF (C2_Execute)		
Packet Function	Switch off nude gauge		
Generation Rules			
Header Information			
Process ID	80	Packet Category	12
Service Type	204	Service Subtype	11
Structure ID		Packet length	14
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	C2_NGOFF	2 octet	Fixed field set to 1
Notes:			

Telecommand Packet Information			
Packet Name	<b>ZRNC2202</b>	Instrument	ROSINA
Packet Description	C2_RGOFF (C2_Execute)		
Packet Function	Switch off ram gauge		
Generation Rules			
Header Information			
Process ID	80	Packet Category	12
Service Type	204	Service Subtype	11
Structure ID		Packet length	14
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	C2_RGOFF	2 octet	Fixed field set to 2
Notes:			

3.3.5 ZRNC2003 (C2\_Function)

Telecommand Packet Information			
Packet Name	<b>ZRNC2302</b>	Instrument	ROSINA
Packet Description	OC_ABORT (C2_Function)		
Packet Function	Abort all COPS functions.		
Generation Rules	<b>Emergency use only.</b>		
Header Information			
Process ID	80	Packet Category	12
Service Type	204	Service Subtype	12
Structure ID		Packet length	30
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	Abort functions	2 octet	Fixed field set to 2
PRNGC200	COPS PAD-32 bits	4 octet	Not modifiable, set to 0.
PRNGC200	COPS PAD-32 bits	4 octet	Not modifiable, set to 0.
PRNGC200	COPS PAD-32 bits	4 octet	Not modifiable, set to 0.
PRNGC200	COPS PAD-32 bits	4 octet	Not modifiable, set to 0.
Notes: Internal use only. To be acknowledged manually by ground operators.			

Telecommand Packet Information			
Packet Name	<b>ZRNC2303</b>	Instrument	ROSINA
Packet Description	OC_NGRGON (C2_Function)		
Packet Function	Switch on nude or ram gauge.		
Generation Rules			
Header Information			
Process ID	80	Packet Category	12
Service Type	204	Service Subtype	12
Structure ID		Packet length	30
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	OC_NGRGON	2 octet	Fixed field set to 3
PRNGC201	COPS PAD-16 bits	2 octet	Not modifiable, set to 0.
PRNGC202	COPS Fil/MT settings	2 octet	Contains 5 detailed parameters:
PRNDC201	Spare	4 bits	Not modifiable, set to 0
PRNDC202	COPS Fil/MT Array	8 bits	Select Filament or microtips array
PRNDC203	COPS Ion Range	2 bits	Calcurve CRNVC201 0 = Low 1 = Medium 3 = High
PRNDC204	COPS Immission Range	1 bit	Calcurve CRNVC202 0 = Low 1 = High
PRNDC205	COPS Select Gauge	1 bit	Calcurve CRNVC203 0 = Microtips 1 = Filament
PRNGC203	COPS Current Limit	4 octet	Current Limit for Fil/MT.
PRNGC204	COPS Max. Regulation	4 octet	Maximum Regulation value to apply (FP).
PRNGC200	COPS PAD-32 bits	4 octet	Not modifiable, set to 0.
Notes:			



Telecommand Packet Information			
Packet Name	<b>ZRNC2304</b>	Instrument	ROSINA
Packet Description	OC_OPNGRG (C2_Function)		
Packet Function	Operate nude or ram gauge.		
Generation Rules			
Header Information			
Process ID	80	Packet Category	12
Service Type	204	Service Subtype	12
Structure ID		Packet length	30
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	OC_OPNGRG	2 octet	Fixed field set to 4
PRNGC201	COPS PAD-16 bits	2 octet	Not modifiable, set to 0.
<i>PRNGC205</i>	<i>COPS Fil/MT select</i>	<i>2 octet</i>	<i>Contains 2 detailed parameters:</i>
PRNDC206	Spare	15 bits	Not modifiable, set to 0
PRNDC207	COPS Select Gauge	1 bit	Calcurve CRNVC203 0 = Microtips 1 = Filament
PRNGC200	COPS PAD-32 bits	4 octet	Not modifiable, set to 0.
PRNGC200	COPS PAD-32 bits	4 octet	Not modifiable, set to 0.
PRNGC200	COPS PAD-32 bits	4 octet	Not modifiable, set to 0.
Notes:			

## 4. DPU Commands

### 4.1 DPU

Type No.	Name	RSDB	Serv	Sub-serv	Param Count	Enable	Description
P1	P1_Direct	ZRNP1001	208	1	3	X	Direct DPU Command
P2	P_Enable	ZRNP1002	208	2	2		Enable Critical Command
P3	P1_Science	ZRNP1003	208	3	3		Direct Science Readout
P11	P2_Execute	ZRNP2001	208	11	1		Execute single Command
P12	P2_Function	ZRNP2002	208	12	5		Call Function
P14	P2_LoadExeTab	ZRNP2004	208	14	4..61	X	Load Execution Table
P15	P2_LoadTable	ZRNP2005	208	15	6..62	X	Load Table Entry
P30	P3_LoadHK	ZRNP3001	208	30	6	X	Load HK Table Entry
P31	P3_LoadTM	ZRNP3002	208	31	4	X	Load S/C TM Table Entry
P32	P3_LoadFunction	ZRNP3003	208	32	5..79	X	Load Function Code
P33	P3_LoadSW	ZRNP3004	208	33	4..78	X	Load Software
P34	P3_GetSetting	ZRNP3005	208	34	4		Get Table Setting via Event
P50	P4_Mode	ZRNP4001	208	50	5		Set Operation Mode

#### 4.1.1 ZRNP1001 (P1\_Direct)

Telecommand Packet Information			
Packet Name	<b>ZRNP1101</b>	Instrument	ROSINA
Packet Description	Program Memory Test ON		
Packet Function	Start program memory test (generates YRNG3002 event packet)		
Generation Rules			
Header Information			
Process ID	80	Packet Category	12
Service Type	208	Service Subtype	01
Structure ID		Packet length	14
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	PM Test ON	2 octet	Fixed field set to 49409 (0xC101)
Notes: For security, an enable command (ZRNP1002) has to be sent before the direct command will be accepted by DPU. Internal use only.			

Telecommand Packet Information			
Packet Name	<b>ZRNP1181</b>	Instrument	ROSINA
Packet Description	Program Memory Test OFF		
Packet Function	Stop program memory test		
Generation Rules			
Header Information			
Process ID	80	Packet Category	12
Service Type	208	Service Subtype	01
Structure ID		Packet length	14
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	PM Test OFF	2 octet	Fixed field set to 49422 (0xC10E)
Notes: For security, an enable command (ZRNP1002) has to be sent before the direct command will be accepted by DPU. Internal use only.			

Telecommand Packet Information			
Packet Name	<b>ZRNP1102</b>	Instrument	ROSINA
Packet Description	Data Memory 1 Test ON		
Packet Function	Start data memory 1 test (generates YRNG3003 event packet)		
Generation Rules			
Header Information			
Process ID	80	Packet Category	12
Service Type	208	Service Subtype	01
Structure ID		Packet length	14
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	DM1 Test ON	2 octet	Fixed field set to 49665 (0xC201)
Notes: For security, an enable command (ZRNP1002) has to be sent before the direct command will be accepted by DPU. Internal use only.			

Telecommand Packet Information			
Packet Name	<b>ZRNP1182</b>	Instrument	ROSINA
Packet Description	Data Memory 1 Test OFF		
Packet Function	Stop data memory 1 test		
Generation Rules			
Header Information			
Process ID	80	Packet Category	12
Service Type	208	Service Subtype	01
Structure ID		Packet length	14
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	DM1 Test OFF	2 octet	Fixed field set to 49678 (0xC20E)
Notes: For security, an enable command (ZRNP1002) has to be sent before the direct command will be accepted by DPU. Internal use only.			

Telecommand Packet Information			
Packet Name	<b>ZRNP1103</b>	Instrument	ROSINA
Packet Description	Data Memory 2 Test ON		
Packet Function	Start data memory 2 test (generates YRNG3003 event packet)		
Generation Rules			
Header Information			
Process ID	80	Packet Category	12
Service Type	208	Service Subtype	01
Structure ID		Packet length	14
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	DM2 Test ON	2 octet	Fixed field set to 49681 (0xC211)
Notes: For security, an enable command (ZRNP1002) has to be sent before the direct command will be accepted by DPU. Internal use only.			

Telecommand Packet Information			
Packet Name	<b>ZRNP1183</b>	Instrument	ROSINA
Packet Description	Data Memory 2 Test OFF		
Packet Function	Stop data memory 2 test		
Generation Rules			
Header Information			
Process ID	80	Packet Category	12
Service Type	208	Service Subtype	01
Structure ID		Packet length	14
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	DM2 Test OFF	2 octet	Fixed field set to 49694 (0xC21E)
Notes: For security, an enable command (ZRNP1002) has to be sent before the direct command will be accepted by DPU. Internal use only.			

Telecommand Packet Information			
Packet Name	<b>ZRNP1104</b>	Instrument	ROSINA
Packet Description	Program EEPROM Memory Test ON		
Packet Function	Start program EEPROM memory test (generates YRNG3004 event packet)		
Generation Rules			
Header Information			
Process ID	80	Packet Category	12
Service Type	208	Service Subtype	01
Structure ID		Packet length	14
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	EEPROM Mem Test ON	2 octet	Fixed field set to 49153 (0xC001)
Notes: For security, an enable command (ZRNP1002) has to be sent before the direct command will be accepted by DPU. Internal use only.			

Telecommand Packet Information			
Packet Name	<b>ZRNP1184</b>	Instrument	ROSINA
Packet Description	Program EEPROM Memory Test OFF		
Packet Function	Stop program EEPROM memory test		
Generation Rules			
Header Information			
Process ID	80	Packet Category	12
Service Type	208	Service Subtype	01
Structure ID		Packet length	14
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	EEPROM Mem Test OFF	2 octet	Fixed field set to 49166 (0xC00E)
Notes: For security, an enable command (ZRNP1002) has to be sent before the direct command will be accepted by DPU. Internal use only.			

Telecommand Packet Information			
Packet Name	<b>ZRNP1105</b>	Instrument	ROSINA
Packet Description	Status EEPROM Memory Test ON		
Packet Function	Start status EEPROM memory test (generates YRNG3004 event packet)		
Generation Rules			
Header Information			
Process ID	80	Packet Category	12
Service Type	208	Service Subtype	01
Structure ID		Packet length	14
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	Stat EEPROM Test ON	2 octet	Fixed field set to 49169 (0xC011)
Notes: For security, an enable command (ZRNP1002) has to be sent before the direct command will be accepted by DPU. Internal use only.			

Telecommand Packet Information			
Packet Name	<b>ZRNP1185</b>	Instrument	ROSINA
Packet Description	Status EEPROM Memory Test OFF		
Packet Function	Stop status EEPROM memory test		
Generation Rules			
Header Information			
Process ID	80	Packet Category	12
Service Type	208	Service Subtype	01
Structure ID		Packet length	14
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	Stat EEPROM Test OFF	2 octet	Fixed field set to 49182 (0xC01E)
Notes: For security, an enable command (ZRNP1002) has to be sent before the direct command will be accepted by DPU. Internal use only.			

Telecommand Packet Information			
Packet Name	<b>ZRNP1106</b>	Instrument	ROSINA
Packet Description	Program EEPROM ON		
Packet Function	Switch power of program EEPROM on		
Generation Rules			
Header Information			
Process ID	80	Packet Category	12
Service Type	208	Service Subtype	01
Structure ID		Packet length	14
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	EEPROM ON	2 octet	Fixed field set to 32769 (0x8001)
Notes: For security, an enable command (ZRNP1002) has to be sent before the direct command will be accepted by DPU. Internal use only.			

Telecommand Packet Information			
Packet Name	<b>ZRNP1186</b>	Instrument	ROSINA
Packet Description	Program EEPROM OFF		
Packet Function	Switch power of program EEPROM off		
Generation Rules			
Header Information			
Process ID	80	Packet Category	12
Service Type	208	Service Subtype	01
Structure ID		Packet length	14
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	EEPROM OFF	2 octet	Fixed field set to 32782 (0x800E)
Notes: For security, an enable command (ZRNP1002) has to be sent before the direct command will be accepted by DPU. Internal use only.			

Telecommand Packet Information			
Packet Name	<b>ZRNP1107</b>	Instrument	ROSINA
Packet Description	Status EEPROM ON		
Packet Function	Switch power of status EEPROM on		
Generation Rules			
Header Information			
Process ID	80	Packet Category	12
Service Type	208	Service Subtype	01
Structure ID		Packet length	14
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	STAT EEPROM ON	2 octet	Fixed field set to 32833 (0x8041)
Notes: For security, an enable command (ZRNP1002) has to be sent before the direct command will be accepted by DPU. Internal use only.			

Telecommand Packet Information			
Packet Name	<b>ZRNP1187</b>	Instrument	ROSINA
Packet Description	Status EEPROM OFF		
Packet Function	Switch power of status EEPROM off		
Generation Rules			
Header Information			
Process ID	80	Packet Category	12
Service Type	208	Service Subtype	01
Structure ID		Packet length	14
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	STAT EEPROM OFF	2 octet	Fixed field set to 32846 (0x804E)
Notes: For security, an enable command (ZRNP1002) has to be sent before the direct command will be accepted by DPU. Internal use only.			

Telecommand Packet Information			
Packet Name	<b>ZRNP1108</b>	Instrument	ROSINA
Packet Description	Data memory 2 ON		
Packet Function	Switch power of data memory 2 on		
Generation Rules			
Header Information			
Process ID	80	Packet Category	12
Service Type	208	Service Subtype	01
Structure ID		Packet length	14
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	SRAM2 ON	2 octet	Fixed field set to 32865 (0x8061)
Notes: For security, an enable command (ZRNP1002) has to be sent before the direct command will be accepted by DPU. Internal use only.			

Telecommand Packet Information			
Packet Name	<b>ZRNP1188</b>	Instrument	ROSINA
Packet Description	Data memory 2 OFF		
Packet Function	Switch power of data memory 2 off		
Generation Rules			
Header Information			
Process ID	80	Packet Category	12
Service Type	208	Service Subtype	01
Structure ID		Packet length	14
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	SRAM2 OFF	2 octet	Fixed field set to 32878 (0x806E)
Notes: For security, an enable command (ZRNP1002) has to be sent before the direct command will be accepted by DPU. Internal use only.			

## 4.1.2 ZRNP1002 (P\_Enable)

Telecommand Packet Information			
Packet Name	<b>ZRNP1002</b>	Instrument	ROSINA
Packet Description	P_Enable		
Packet Function	Enable critical command (enable column marked in table 4.1)		
Generation Rules			
Header Information			
Process ID	80	Packet Category	12
Service Type	208	Service Subtype	02
Structure ID		Packet length	16
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
PRNGP102	Subservice	2 octet	Contains 2 detailed parameters:
PRNDP104	Spare	1 octet	0
PRNDP105	Subservice of critical cmd	1 octet	e.g. 1 for ZRNP1001
PRNGP110	Opcode of critical cmd	2 octet	First two bytes of parameters (e.g. PRNGP101 for ZRNP1001)
Notes: One enable is valid until another enable command is sent.			

Telecommand Packet Information			
Packet Name	<b>ZRNP1201</b>	Instrument	ROSINA
Packet Description	Enable Program Memory Test ON		
Packet Function	Enable direct command		
Generation Rules			
Header Information			
Process ID	80	Packet Category	12
Service Type	208	Service Subtype	02
Structure ID		Packet length	16
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	Enable subservice 1	2 octet	Fixed field set to 1
N/A	PM Test ON	2 octet	Fixed field set to 49409 (0xC101)
Notes: Internal use only.			

Telecommand Packet Information			
Packet Name	<b>ZRNP1281</b>	Instrument	ROSINA
Packet Description	Enable Program Memory Test OFF		
Packet Function	Enable direct command		
Generation Rules			
Header Information			
Process ID	80	Packet Category	12
Service Type	208	Service Subtype	02
Structure ID		Packet length	16
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	Enable subservice 1	2 octet	Fixed field set to 1
N/A	PM Test OFF	2 octet	Fixed field set to 49422 (0xC10E)
Notes: Internal use only.			



Telecommand Packet Information			
Packet Name	<b>ZRNP1202</b>	Instrument	ROSINA
Packet Description	Enable Data Memory 1 Test ON		
Packet Function	Enable direct command		
Generation Rules			
Header Information			
Process ID	80	Packet Category	12
Service Type	208	Service Subtype	02
Structure ID		Packet length	16
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	Enable subservice 1	2 octet	Fixed field set to 1
N/A	DM1 Test ON	2 octet	Fixed field set to 49665 (0xC201)
Notes: Internal use only.			

Telecommand Packet Information			
Packet Name	<b>ZRNP1282</b>	Instrument	ROSINA
Packet Description	Enable Data Memory 1 Test OFF		
Packet Function	Enable direct command		
Generation Rules			
Header Information			
Process ID	80	Packet Category	12
Service Type	208	Service Subtype	02
Structure ID		Packet length	16
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	Enable subservice 1	2 octet	Fixed field set to 1
N/A	DM1 Test OFF	2 octet	Fixed field set to 49678 (0xC20E)
Notes: Internal use only.			

Telecommand Packet Information			
Packet Name	<b>ZRNP1203</b>	Instrument	ROSINA
Packet Description	Enable Data Memory 2 Test ON		
Packet Function	Enable direct command		
Generation Rules			
Header Information			
Process ID	80	Packet Category	12
Service Type	208	Service Subtype	02
Structure ID		Packet length	16
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	Enable subservice 1	2 octet	Fixed field set to 1
N/A	DM2 Test ON	2 octet	Fixed field set to 49681 (0xC211)
Notes: Internal use only.			

Telecommand Packet Information			
Packet Name	<b>ZRNP1283</b>	Instrument	ROSINA
Packet Description	Enable Data Memory 2 Test OFF		
Packet Function	Enable direct command		
Generation Rules			
Header Information			
Process ID	80	Packet Category	12
Service Type	208	Service Subtype	02
Structure ID		Packet length	16
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	Enable subservice 1	2 octet	Fixed field set to 1
N/A	DM2 Test OFF	2 octet	Fixed field set to 49694 (0xC21E)
Notes: Internal use only.			

Telecommand Packet Information			
Packet Name	<b>ZRNP1204</b>	Instrument	ROSINA
Packet Description	Enable Program EEPROM Memory Test ON		
Packet Function	Enable direct command		
Generation Rules			
Header Information			
Process ID	80	Packet Category	12
Service Type	208	Service Subtype	02
Structure ID		Packet length	16
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	Enable subservice 1	2 octet	Fixed field set to 1
N/A	EEPROM Mem Test ON	2 octet	Fixed field set to 49153 (0xC001)
Notes: Internal use only.			

Telecommand Packet Information			
Packet Name	<b>ZRNP1284</b>	Instrument	ROSINA
Packet Description	Enable Program EEPROM Memory Test OFF		
Packet Function	Enable direct command		
Generation Rules			
Header Information			
Process ID	80	Packet Category	12
Service Type	208	Service Subtype	02
Structure ID		Packet length	16
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	Enable subservice 1	2 octet	Fixed field set to 1
N/A	EEPROM Mem Test OFF	2 octet	Fixed field set to 49166 (0xC00E)
Notes: Internal use only.			

Telecommand Packet Information			
Packet Name	<b>ZRNP1205</b>	Instrument	ROSINA
Packet Description	Enable Status EEPROM Memory Test ON		
Packet Function	Enable direct command		
Generation Rules			
Header Information			
Process ID	80	Packet Category	12
Service Type	208	Service Subtype	02
Structure ID		Packet length	16
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	Enable subservice 1	2 octet	Fixed field set to 1
N/A	Stat EEPROM Test ON	2 octet	Fixed field set to 49169 (0xC011)
Notes: Internal use only.			

Telecommand Packet Information			
Packet Name	<b>ZRNP1285</b>	Instrument	ROSINA
Packet Description	Enable Status EEPROM Memory Test OFF		
Packet Function	Enable direct command		
Generation Rules			
Header Information			
Process ID	80	Packet Category	12
Service Type	208	Service Subtype	02
Structure ID		Packet length	16
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	Enable subservice 1	2 octet	Fixed field set to 1
N/A	Stat EEPROM Test OFF	2 octet	Fixed field set to 49182 (0xC01E)
Notes: Internal use only.			

Telecommand Packet Information			
Packet Name	<b>ZRNP1206</b>	Instrument	ROSINA
Packet Description	Enable Program EEPROM ON		
Packet Function	Enable direct command		
Generation Rules			
Header Information			
Process ID	80	Packet Category	12
Service Type	208	Service Subtype	02
Structure ID		Packet length	16
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	Enable subservice 1	2 octet	Fixed field set to 1
N/A	EEPROM ON	2 octet	Fixed field set to 32769 (0x8001)
Notes: Internal use only.			

Telecommand Packet Information			
Packet Name	<b>ZRNP1286</b>	Instrument	ROSINA
Packet Description	Enable Program EEPROM OFF		
Packet Function	Enable direct command		
Generation Rules			
Header Information			
Process ID	80	Packet Category	12
Service Type	208	Service Subtype	02
Structure ID		Packet length	16
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	Enable subservice 1	2 octet	Fixed field set to 1
N/A	EEPROM OFF	2 octet	Fixed field set to 32782 (0x800E)
Notes: Internal use only.			

Telecommand Packet Information			
Packet Name	<b>ZRNP1207</b>	Instrument	ROSINA
Packet Description	Enable Status EEPROM ON		
Packet Function	Enable direct command		
Generation Rules			
Header Information			
Process ID	80	Packet Category	12
Service Type	208	Service Subtype	02
Structure ID		Packet length	16
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	Enable subservice 1	2 octet	Fixed field set to 1
N/A	STAT EEPROM ON	2 octet	Fixed field set to 32833 (0x8041)
Notes: Internal use only.			

Telecommand Packet Information			
Packet Name	<b>ZRNP1287</b>	Instrument	ROSINA
Packet Description	Enable Status EEPROM OFF		
Packet Function	Enable direct command		
Generation Rules			
Header Information			
Process ID	80	Packet Category	12
Service Type	208	Service Subtype	02
Structure ID		Packet length	16
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	Enable subservice 1	2 octet	Fixed field set to 1
N/A	STAT EEPROM OFF	2 octet	Fixed field set to 32846 (0x804E)
Notes: Internal use only.			

Telecommand Packet Information			
Packet Name	<b>ZRNP1208</b>	Instrument	ROSINA
Packet Description	Enable Data memory 2 ON		
Packet Function	Enable direct command		
Generation Rules			
Header Information			
Process ID	80	Packet Category	12
Service Type	208	Service Subtype	02
Structure ID		Packet length	16
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	Enable subservice 1	2 octet	Fixed field set to 1
N/A	SRAM2 ON	2 octet	Fixed field set to 32865 (0x8061)
Notes: Internal use only.			

Telecommand Packet Information			
Packet Name	<b>ZRNP1288</b>	Instrument	ROSINA
Packet Description	Enable Data memory 2 OFF		
Packet Function	Enable direct command		
Generation Rules			
Header Information			
Process ID	80	Packet Category	12
Service Type	208	Service Subtype	02
Structure ID		Packet length	16
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	Enable subservice 1	2 octet	Fixed field set to 1
N/A	SRAM2 OFF	2 octet	Fixed field set to 32878 (0x806E)
Notes: Internal use only.			

## 4.1.3 ZRNP1003 (P1\_Science)

Telecommand Packet Information			
Packet Name	<b>ZRNP1301</b>	Instrument	ROSINA
Packet Description	Simulate Error Event		
Packet Function	Forces the sending of a dummy error event to S/C		
Generation Rules			
Header Information			
Process ID	80	Packet Category	12
Service Type	208	Service Subtype	03
Structure ID		Packet length	22
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	Generate Error Event	2 octet	Fixed field set to 33792 (0x8400)
PRNGX101	Event Parameters	4 octet	First four bytes of event data
PRNGX102	Simulated Event ID	4 octet	Event ID to send
Notes: Internal use only.			

4.1.4 ZRNP2001 (P2\_Execute)

Telecommand Packet Information			
Packet Name	<b>ZRNP2100</b>	Instrument	ROSINA
Packet Description	OP_Normal (P2_Execute)		
Packet Function	Set sensor power interface to normal mode (I/F A & Pwr A / I/F B & Pwr B)		
Generation Rules			
Header Information			
Process ID	80	Packet Category	12
Service Type	208	Service Subtype	11
Structure ID		Packet length	14
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	OP_Normal	2 octet	Fixed field set to 0
Notes:			

Telecommand Packet Information			
Packet Name	<b>ZRNP2101</b>	Instrument	ROSINA
Packet Description	OP_Cross (P2_Execute)		
Packet Function	Set sensor power interface to cross coupling mode (I/F A & Pwr B / I/F B & Pwr A)		
Generation Rules			
Header Information			
Process ID	80	Packet Category	12
Service Type	208	Service Subtype	11
Structure ID		Packet length	14
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	OP_Cross	2 octet	Fixed field set to 1
Notes:			

## 4.1.5 ZRNP2002 (P2\_Function)

Telecommand Packet Information			
Packet Name	<b>ZRNP2201</b>	Instrument	ROSINA
Packet Description	OP_GCUREG DFMS (P2_Function)		
Packet Function	Setup DFMS gas calibration unit regulation		
Generation Rules	<b>Controlled high vacuum (&lt; 6 x 10<sup>-7</sup> mbar) has to be inside DFMS.</b>		
Header Information			
Process ID	80	Packet Category	12
Service Type	208	Service Subtype	12
Structure ID		Packet length	30
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	OP_GCUREG	2 octet	Fixed field set to 1
N/A	Unit DFMS	4 octet	Fixed field set to 1
PRNGX201	Select DFMS GCU	4 octet	Calcurve CRNVP201 1 = GCU 1 2 = GCU 2
N/A	Monitoring table entry	4 octet	Fixed field set to 1
PRNGX202	DFMS GCU out pressure limit	4 octet	Regulation pressure limit in HK raw value
Notes: For security, an enable command (ZRNP1002) has to be sent before the command will be accepted by DPU.			

Telecommand Packet Information			
Packet Name	<b>ZRNP2202</b>	Instrument	ROSINA
Packet Description	OP_GCUREG RTOF (P2_Function)		
Packet Function	Setup RTOF gas calibration unit regulation		
Generation Rules	<b>Controlled high vacuum (&lt; 6 x 10<sup>-7</sup> mbar) has to be inside RTOF.</b>		
Header Information			
Process ID	80	Packet Category	12
Service Type	208	Service Subtype	12
Structure ID		Packet length	30
Data Field Information			
Parameter Name	Parameter Description	Field Structure	Remarks
N/A	OP_GCUREG	2 octet	Fixed field set to 1
N/A	Unit RTOF	4 octet	Fixed field set to 2
PRNGX203	Select RTOF GCU	4 octet	Calcurve CRNVP201 1 = GCU 1 2 = GCU 2
N/A	Monitoring table entry	4 octet	Fixed field set to 1
PRNGX204	RTOF GCU out pressure limit	4 octet	Regulation pressure limit in HK raw value
Notes: For security, an enable command (ZRNP1002) has to be sent before the command will be accepted by DPU.			



## 5. Instrument Commands

### 5.1 All sensors

Type No.	Name	RSDB	Serv	Sub-serv	Param Count	P_Enable	Description
I50	I4_Pressure	ZRNG4001	192	50	5		Enable Pressure Check
I70	I5_Sequence	ZRNG5001	192	70	5		Sequence DFMS & RTOF
I71	I5_LoadSeq	ZRNG5002	192	71	6..177	X	Load Sequence Table
I72	I5_Compression	ZRNG5003	192	72	5		Data Compression
I73	I5_Detect	ZRNG5004	192	73	10		Automatic Mass Detect