



CENTRE NATIONAL D'ETUDES SPATIALES

INTEGRAL SPECTROMETER



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INTERNATIONAL GAMMA RAY ASTROPHYSICS LABORATORY

SPECTROMETER USER MANUAL

ANNEXES

VOLUME 3

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FOREWORD

The Spectrometer User's Manual is made up of four volumes:

Volume 1 "Spectrometer Definition"

Provides the instrument description, the different functioning modes at instrument and sub-assembly levels, instrument system budgets. It describes all the interfaces such as mechanical, thermal, electrical data flows and on-board software functioning. A list of each telecommand and telemetry packet and the definition of each parameter are also included.

Volume 2 "Instrument Operations"

Gives all the information needed to operate the spectrometer, particularly a functioning description of some special modes such as eclipse management, cooling management, ..., tables showing equipment temperatures ranges, power consumption, allowed TC's, downlinked TM's according to the running instrument mode. The flight procedures are also given.

Volume 3 "Annexes"

Gathers main documents giving additional information which allows a better understanding of the instrument functioning for example, TM/TC and electrical diagrams, science data format, observer manual inputs, complementary documents of on-board software.

Volume 4 "Data Base Description"

Contains a precise description of each telecommand and telemetry packet, and all parameters characteristics.



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DOCUMENTATION CHANGE RECORD

Issue	Revision	Date	Modified Pages	Observations
4	0	10/11/00	All pages	SPI-DM-0-351-CNES This is the first issue of the Volume 3. For homogeneity reasons with regard to the other volumes, this first issue is numbered "4.0".
4	1	24/04/01	Pages ANX8-1 à ANX8-50 Pages ANX8a-1 à ANX8a-20 Pages ANX9-2 à ANX9-7	SPI-DM-0-471-CNES SPI-DM-0-474-CNES SPI-DM-422-480-CNES
4	2	19/06/01	Annex 1: TM/TC DIAGRAM Annex 3: SPI-ST-0-2911-CNES Issue 2 Rev. 3 Annex 11	SPI-DM-0-494-CNES SPI-DM-0-494-CNES
5	0	05/03/02	Page IV, ANX12-1 Page IV, all pages ANX18 Page ANX13-1 Pages ANX9, ANX10, ANX11, ANX12, ANX14, ANX15 Page IV Pages ANX16 Page IV Pages ANX17 Page IV Pages ANX19 All pages ANX16	SPI-DM-423-512-CNES SPI-DM-0-522-CNES SPI-DM-0-524-CNES SPI-DM-0-525-CNES SPI-DM-7-528-CNES SPI-DM-41-529-CNES



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5	1	25/06/02	All pages ANX6 ANX7-A ANX20, 21, 22	SPI-DM-0-537-CNES SPI-DM-5-540-CNES SPI-DM-0-543-CNES
5	2	09/09/02	ANX16-8, ANX16-10 All pages ANX7 All pages ANX16	SPI-DM-0-541-CNES SPI-DM-5-553-CNES SPI-DM-41-554-CNES
5	3	14/04/03	ALL ANX5 ALL ANX 5 ANX3-1 Pages I,III,5	SPI-DM-0-564-CNES SPI-DM-7-559-CNES SPI-DM-0-576-CNES



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ANNEX 7 - DFEE User's Manual

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ANNEX 13 - ACS User's Manual

ANNEX 14 - ACS – Interconnection of Scintillator modules with FEE's

ANNEX 15 - Cooler System User's Manual

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ANNEX 21 - OBSMS – SGS ICD

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0. INTRODUCTION

0.1. PURPOSE

This document gathers main documents giving additional information which allows a better understanding of the instrument functioning for example, TM/TC and electrical diagrams, science data format, observer manual inputs, complementary documents of on-board software.

0.2. APPLICABLE AND REFERENCE DOCUMENTS

0.2.1. Applicable documents

AD1	ESA-EID-Part A	Issue 1, rev. 5
AD2	ESA-DV-0-30-CNES	
AD3	INT-RP-AI-0030	

0.2.2. Reference documents

RD2	SPI-Functional Analysis	SPI-NT-0-1100-CNES
RD3	Product Assurance Plan	SPI-PA-0-50-CNES
RD4	Instrument Mission Specification	SPI-SM-0-90-CSCI
RD5	Instrument and System Specification	SPI-ST-0-91-CNES
RD6	General Electrical Specification	SPI-SG-0-80-CNES
RD7	General Mechanical Design Specification	SPI-SG-0-82-CNES
RD8	General Thermal Design Specification	SPI-SG-0-83-CNES
RD9	Electromagnetics Requirements	SPI-SG-0-84-CNES
RD10	General Modelling Specification	SPI-SG-0-85-CNES
RD11	Lower Structure Sub-assembly Specification	SPI-ST-2-1042-CNES
RD12	Mask Sub-assembly Specification	SPI-ST-3-1043-CNES
RD13	Anticoincidence Sub-assembly Specification	SPI-ST-1-1041-CNES
RD14	Specification Technique de Besoin du DFEE	SPI-ST-5-1045-CNES



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RD15	User Requirement Document for DPE Software	SPI-ST-7-1047-CNES
RD16	Camera Sub-assembly Specification	SPI-ST-4-1044-CNES
RD17	DPE Hardware Specification	INT-SP-AL-0001
RD18	Instrument Design Report	SPI-DD-1088-CNES
RD19	Specifications of the Integral Spectrometer Finite Element Model Reduction	SPI-SP-0-3023-CNES
RD20	EID-B	SPI-SG-0/SAT-1111-CNES
RD21	SPI Interfaces Specification	SPI-SI-0-1324-CNES
RD22	SPI System Telemetry Budget	SPI-NT-0-13037-CNES
RD23	SPI Science Data Format Specification	SPI-NT-0-2911-CNES
RD24	SPI Instrument and System Geometrical Quality Budget	SPI-NT-0-13067-CNES



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ANNEX 1

TM/TC DIAGRAM



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TM/TC DIAGRAM DETAILED LEGEND

Telecommands:

Upper case: TC name

General structure : tc_aa_bb_cccccc

aa ⇒ c : for configuration - all parameters setting

r or rm : for report - all parameters read in IASW memory after configuration or measured parameters

bb ⇒ af : AFEE

df : DFEE

as : ACS

pd : PSD

cc... ⇒ : Object identifier

Medium case : Short TC description

Lower Case : Instrument DB identifier

Telemetry:

Shadowed symbols: (HK telemetry parameters)

Upper case : contains the short identifier (those defined by SPI team)

general structure: a_bb_cccccc_dmn (16 characters max)

a ⇒ t = temperature

u = voltage

i = current

s = status

c = counting

r = report

bb ⇒ s/a related

cr = cryostat

af = analog chains (AFEE2) + I/F TM/TC (AFEE1)

df = DFEE

pd = PSD

pc = passive cooling

ac = active cooling

cc.. ⇒ parameter mnemonic identifier

dmn ⇒ data transfer equipment

l = low speed link

r = mini-RTU

u = RTU

mn = serial number



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Medium case : Short TC description

Lower case : Instrument DB identifier (ex: E3997 > 60602/4 means:
the value is downlinked in packet n° 60602/ data block n°4)

Light symbols: (HK telemetry packets)

Upper case : contains the packet type (cyclical or corresponding to an on-request TC)

cyclical structure: aa_bbbbbbbb_n

aa ⇒ tm= telemetry packet

bb.. ⇒ downlinked frequency (80x80s; 480x8s)

n ⇒ serial number

on-request TM: aa-bb_cc_dddddd

aa ⇒ tm= telemetry packet

bb ⇒ or = on-request

cc ⇒ from s/a (af, df, as, pd, iasw)

dd... ⇒ packet mnemonic identifier

Medium case : TPN or FTPN number

Lower case : Data block number in which the data are.