



CENTRE NATIONAL D'ETUDES SPATIALES

INTEGRAL SPECTROMETER



SPI-MU-0-1062V3-CNES

Issue : 5

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ANNEX 11

AFEE USER'S MANUAL



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1.4 Value of command to configure a chain

FUNCTIONS	VALUES	WORD CONTENT							
		7	6	5	4	3	2	1	0
Selection HK to be coded (internal function of AFEE TM/TC box)	0 to 7						0	0	0
Validation NOMINAL coupler	Disable					0			
	Enable					1			
Validation REDONDANT coupler	Disable				0				
	Enable				1				
Auto or Manuel range	Auto			0					
	Manuel			1					
range 0 - 2 MeV or 0 - 8 MeV	0 - 2 MeV		0						
	0 - 8 MeV		1						
High-Energy clamping	ON	0							
	OFF	1							

1.5 Value of command ON/OFF LVPS-DET

FUNCTIONS	VALUES	WORD CONTENT							
		7	6	5	4	3	2	1	0
OFF or ON LVPS-DET	OFF								0
	ON								1
		0							0



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Remark: for every execution of an ON LVPS, the AFEE TM/TC will position in "1" during 1 second the bit 0 of the MS byte of the message STATUS. This duration of 1 second corresponds in the time of establishment of the LVPS tension.

1.6 Value of command ON/OFF HVPS

FUNCTIONS	VALUES	WORD CONTENT							
		7	6	5	4	3	2	1	0
OFF or ON HVPS	OFF								0
	ON								1
								0	
		0							

1.7 Value of command to select the coding range of the cryogenic temperatures

FUNCTIONS	VALUES	WORD CONTENT							
		7	6	5	4	3	2	1	0
Selection coding range of cryogenic temperatures.	Range 1 (62°K .. 410°K)								0
	Range 2 (62°K .. 128°K)								1
								0	
		0							



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2 CONTAIN OF THE TECHNOLOGICAL SERVITUDES OF THE AFEE

In the AFEE TM/TC, all servitudes are coded by means of a converter (ADC) on 12 bits. In the case of the servitudes passed on 8 bits one acquires the most significant 8 bits of the result of coding. For the servitudes on 16 bits, one acquires the 12 bits of the coding and one arranges them in a word of 16 bits where the 4 bits of strong weight are always 0.

2.1 Contain of the technological servitudes of each chain

	Technological servitudes Chains 0 to 18	Coded values
0	Preamplifier temperature	Temperature measure on 16 bits (12 useful bits) $0 \leq TPA \leq 511^{\circ}\text{K}$
1	HT value	HT's control tension measure over 8 bits $0 \leq HT \leq 5000 \text{ V}$
2	Low threshold of analysis value	Low threshold tension measure over 8 bits $0 \leq \text{Low threshold} \leq 255 \text{ keV}$
3	Secondary tension of the LVPS-DET	Tension measure over 8 bits $0 \leq \text{LVPS_DET} \leq 12,6 \text{ V}$
4	LVPS-DET temperature	Temperature measure over 8 bits
5	CAN temperature	Temperature measure over 16 bits (12 useful bits) $0 \leq T_CAN \leq 511^{\circ}\text{K}$
6	Continuous tension taken out preamplifier	Tension measure over 8 bits
7	Analysis configuration	Coding on 2 bits: 00: auto range - 0...2 MeV 01: auto range - 0...8 MeV 10: manual range - 0...2 MeV 11: manual range - 0...8 MeV



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2.2 Contain of cryogenic temperatures servitudes

Technological servitudes		Coded values
0	Cold Plate temperature 1	Temperature measure over 16 bits (12 useful bits) Range 1 (62°K .. 410°K) – 61,3°K ≤ T_CRYO ≤ 416°K Range 2 (62°K .. 128°K) – 61,3°K ≤ T_CRYO ≤ 128,3°K
1	Cold Plate temperature 2	Temperature measure over 16 bits (12 useful bits) Range 1 (62°K .. 410°K) – 61,3°K ≤ T_CRYO ≤ 416°K Range 2 (62°K .. 128°K) – 61,3°K ≤ T_CRYO ≤ 128,3°K
2	Cold Plate temperature 3	Temperature measure over 16 bits (12 useful bits) Range 1 (62°K .. 410°K) – 61,3°K ≤ T_CRYO ≤ 416°K Range 2 (62°K .. 128°K) – 61,3°K ≤ T_CRYO ≤ 128,3°K
3	Cold Plate temperature 4	Temperature measure over 16 bits (12 useful bits) Range 1 (62°K .. 410°K) – 61,3°K ≤ T_CRYO ≤ 416°K Range 2 (62°K .. 128°K) – 61,3°K ≤ T_CRYO ≤ 128,3°K
4	Thermal Braid temperature 1	Temperature measure over 16 bits (12 useful bits) Range 1 (62°K .. 410°K) – 61,3°K ≤ T_CRYO ≤ 416°K Range 2 (62°K .. 128°K) – 61,3°K ≤ T_CRYO ≤ 128,3°K
5	Thermal Braid temperature 2	Temperature measure over 16 bits (12 useful bits) Range 1 (62°K .. 410°K) – 61,3°K ≤ T_CRYO ≤ 416°K Range 2 (62°K .. 128°K) – 61,3°K ≤ T_CRYO ≤ 128,3°K
6	Thermal Braid temperature 3	Temperature measure over 16 bits (12 useful bits) Range 1 (62°K .. 410°K) – 61,3°K ≤ T_CRYO ≤ 416°K Range 2 (62°K .. 128°K) – 61,3°K ≤ T_CRYO ≤ 128,3°K
7	Thermal Braid temperature 4	Temperature measure over 16 bits (12 useful bits) Range 1 (62°K .. 410°K) – 61,3°K ≤ T_CRYO ≤ 416°K Range 2 (62°K .. 128°K) – 61,3°K ≤ T_CRYO ≤ 128,3°K

2.3 Contain of general servitudes of AFEE TM/TC

Technological servitudes		Coded values
0	Current source 1 mA (for PT500)	Control tension measure over 16 bits $0 \leq I \leq 5.1 \text{ mA}$
1	AFEE TM/TC electronic temperature	Temperature measure over 16 bits $-273 \leq T \leq +237^\circ\text{C}$
2	Regeneration 1 subjection temperature (IT-CAM 1)	Temperature measure over 16 bits (12 useful bits)
3	Regeneration 2 subjection temperature (IT-CAM 2)	Temperature measure over 16 bits (12 useful bits)