



CENTRE NATIONAL D'ETUDES SPATIALES

INTEGRAL SPECTROMETER



SPI-MU-0-1062V3-CNES

Issue : 5

Revision : 0

Date : 28/02/02

Page No. : ANX14-1

ANNEX 14

ACS – INTERCONNECTION OF SCINTILLATOR MODULES WITH FEE'S



CENTRE NATIONAL D'ETUDES SPATIALES

INTEGRAL SPECTROMETER




SPI-MU-0-1062V3-CNES

Issue : 5

Revision : 0

Date : 28/02/02

Page No. : ANX14-2

 DaimlerChrysler Aerospace Dornier Dornier Satellitensysteme GmbH	Interconnection of Scint. Modules with FEE's	Ref.: TN-ACS-1200DS/23
		Issue: 7 Date: 31.10.2000 Page: 1 of: 20
Project: INTEGRAL - ACS		

Integral Anticoincidence System (ACS)

Interconnection of Scint. Modules with FEE's

	<i>Name</i>	<i>Function</i>	<i>Date</i>	<i>Signature</i>
Prepared by:	H.J.Jung	SE		
Checked by:	M. Amann	ESE		
Product Assurance:	S. Volk	PA	n. a.	
Released by	H.J.Jung	PM		
Distribution	see distribution tables next page			

Copying of this document, and giving it to others and the use or communication of the contents thereof, are forbidden without express authority. Offenders are liable to the payment of damages. All rights are reserved in the event of the grant of a patent or the registration of a utility model or design.



CENTRE NATIONAL D'ETUDES SPATIALES

INTEGRAL SPECTROMETER



SPI-MU-0-1062V3-CNES

Issue : 5

Revision : 0

Date : 28/02/02

Page No. : ANX14-3

 DaimlerChrysler Aerospace Dornier Dornier Satellitensysteme GmbH	Interconnection of Scint. Modules with FEE's		Ref: TN-ACS-1200DS/23
	Project: INTEGRAL - ACS		Issue: 7 Date: 31.10.2000 Page: 2 of: 20

DISTRIBUTION LIST

Issue / Revision	1	2	3	4	5	6	7
Distribution Date	2.7.98	3.8.98	30.4.99	10.5.00	15.6.00	15.9.00	31.10.00

Intern			Extern		
Department	Name	Qty.	Company	Name	Qty.
ED 12	Jung	1	DLR	Dr. Bachem	
ED 562	Amann	1			
ED 562	Becker				
ED 544	Konrad				
ED 562	Martin				
ED 561	Pfeiffer		CNES	Géraud Liria	
ED 541	Rauscher		MPE	Lichti, Dr.	1
ED 552	Stasch			Georgi, Dr.	
ED 563	Vögele				
ED 62	Volk		DJO	Wolter	1
ED 543	Westphal				



CENTRE NATIONAL D'ETUDES SPATIALES

INTEGRAL SPECTROMETER



SPI-MU-0-1062V3-CNES

Issue : 5

Revision : 0

Date : 28/02/02

Page No. : ANX14-4

 DaimlerChrysler Aerospace Dornier Dornier Satellitensysteme GmbH	Interconnection of Scint. Modules with FEE's	Ref: TN-ACS-1200DS/23
		Issue: 7 Date: 31.10.2000 Page: 3 of: 20
Project: INTEGRAL - ACS		

DOCUMENT CHANGE RECORD

Iss/Rev	Date	Change Notice Number	Modified Pages or Paragraphs	Observations Nature of Change
1	17.7.98		first issue	
2	3.8.98		page 19	change of orientation of PMT's SSA 3-x-x
3	30.4.99		all pages	Elimination of non redundant case Partly change of interconnection scheme (UVS) Introduction of serial numbers for <ul style="list-style-type: none"> • BGO • PMT • FEE Introduction of graphical presentation of interconnection scheme (Annex)
4	10.5.00		pages 7 to 11	Partly change of changed PMT units
5	15.6.00		pages 7 to 11	Change of FEE Ser. No according to FM integration status and replacement of Veto number by FEE number Elimination of Annexes
6	15.9.00		page 7	Replacement of FEE 19 by FEE 78 in UCR Pos. 2.3
7	31.10.00		page 7 page 8 page 9	Replacement FEE 16 by 57 Replacement FEE 45 by 70 Correct PMT number: LCR 1-6-1 now 273255* Replacement FEE 51 by 90

*) exchange has been performed during segment integration at LOS



CENTRE NATIONAL D'ETUDES SPATIALES

INTEGRAL SPECTROMETER




SPI-MU-0-1062V3-CNES

Issue : 5

Revision : 0

Date : 28/02/02

Page No. : ANX14-5

 DaimlerChrysler Aerospace Dornier Dornier Satellitensysteme GmbH	Interconnection of Scint. Modules with FEE's	Ref.: TN-ACS-1200DS/23
Project: INTEGRAL - ACS		Issue: 7 Date: 31.10.2000
		Page: 4 of: 20

CONTENTS

1	SCOPE	5
2	REFERENCE DOCUMENTS	5
3	LIST OF ABBREVIATIONS	5
4	INTERCONNECTION OF SCINTILLATOR MODULES WITH FEE'S	6
4.1	GENERAL	6
4.2	INTERCONNECTION TABLES.....	7
4.2.1	UCR.....	7
4.2.2	LCR.....	7
4.2.3	SSA.....	8
4.2.4	LVS.....	10
5	ORIENTATION SCHEME OF PMT CONNECTORS	12
5.1	GENERAL	12
5.2	PRESENTATION.....	12
5.2.1	Orientation of connectors.....	12
	UCR - PMT's.....	13
5.2.2	LCR - PMT's.....	14
5.2.3	SSA - PMT's	15
5.2.4	LVS - PMT's (vorläufiger Status, noch nicht an die Fertigung weitergeben!!).....	16
5.2.4.1	Side 1	16
5.2.4.2	Side 2	17
5.2.4.3	Side 3	17
	Center.....	19



CENTRE NATIONAL D'ETUDES SPATIALES

INTEGRAL SPECTROMETER




SPI-MU-0-1062V3-CNES

Issue : 5

Revision : 0

Date : 28/02/02

Page No. : ANX14-6

 DaimlerChrysler Aerospace Dornier Dornier Satellitensysteme GmbH	Interconnection of Scint. Modules with FEE's	Ref.: TN-ACS-1200DS/23	
		Issue: 7	Date: 31.10.2000
Project: INTEGRAL - ACS		Page: 5	of: 20

1 Scope

The interconnection of the 91 Scintillator Modules and its 181 PMT's of the ACS with the corresponding 91 FEE's requires to define

- which Scintillator module is placed in which position of the ACS
- which PMT is connected to which FEE and
- the orientation of the connector panel of the PMT in order to enable easy accessibility and shortest cable length.

This document has been established on the basis of MPE considerations and MPE document Ref. /11/.

The numbering used in this document is according to Ref. /16/.

2 Reference documents

Ref. No.	Doc. ID	Document Title
----------	---------	----------------

Contractual -Applicable Documents

/10/	DA-ACS-PS-001	Product Assurance & Safety Requirements
------	---------------	-----------------------------------------

Other Reference Documents

/11/	FMPMT-Zuordnung-050399	MPE - Document
/16/	TN-ACS-1200DS/20	Numbering Scheme for ACS
/19/	LI-ACS-0000DS/05	List of Acronyms and Abbreviations
/25/	TN-ACS-3200DJO/02	STM Detector S/S Design Description
/27/	TN-ACS-3200DJO/04	FM Detector S/S Design Description

3 List of Abbreviations

See Ref. /19/.



CENTRE NATIONAL D'ETUDES SPATIALES

INTEGRAL SPECTROMETER




SPI-MU-0-1062V3-CNES

Issue : 5

Revision : 0

Date : 28/02/02

Page No. : ANX14-7

 DaimlerChrysler Aerospace Dornier Dornier Satellitensysteme GmbH	Interconnection of Scint. Modules with FEE's	Ref.: TN-ACS-1200DS/23	
		Issue: 7	Date: 31.10.2000
Project: INTEGRAL - ACS		Page: 6	of: 20

4 Interconnection of Scintillator Modules with FEE's

4.1 General

The interconnection of the Scintillator Modules and it's PMT's with the corresponding FEE is defined by tables that contain for each segment of the UVS and the LVS

- the position of the scintillator module according to Ref /16/
- the BGO serial number
- the PMT logical number according to Ref /16/
- the PMT serial number
- the FEE physical location according to Ref /16/
- the FEE serial number (this will be introduced after integration of the ACS)
- the veto channel number
- the corresponding cable length PMT - FEE

For better understanding of the physical arrangement of the units the tables are supported by sketches that show the position of the FEE's and PMT's on the segments and the location number according to Ref. /16/.



CENTRE NATIONAL D'ETUDES SPATIALES

INTEGRAL SPECTROMETER



SPI-MU-0-1062V3-CNES
Issue : 5
Revision : 0
Date : 28/02/02
Page No. : ANX14-8

 DaimlerChrysler Aerospace Dornier Dornier Satellitensysteme GmbH	Interconnection of Scint. Modules with FEE's	Ref.: TN-ACS-1200DS/23
		Issue: 7 Date: 31.10.2000 Page: 7 of: 20
Project: INTEGRAL - ACS		

4.2 Interconnection tables

4.2.1 UCR

General	AC-VCU-Conn.	AC-Seg-Conn.	ISB-VCU-Conn.	ISB-Seg-Conn.
UCR main/red.	P07/P08	P01/P02	P9/P10	P11/P12

FEE-Pos	FEE Ser. No.	FEE	Cab.L.	PMT/BGO	PMT-No.	Position	BGO-No.
UCR 1-1	11	1	250	UCR 1-1-2	273380	UCR 1-1	UCR-1#7
UCR 1-1	11	1	400	UCR 1-2-1	272834	UCR 1-2	UCR-1#5
UCR 1-2	12	2	250	UCR 1-2-2	273459	UCR 1-2	UCR-1#5
UCR 1-2	12	2	400	UCR 1-3-1	273547	UCR 1-3	UCR-1#8
UCR 1-3	13	3	250	UCR 1-3-2	273254	UCR 1-3	UCR-1#8
UCR 1-3	13	3	400	UCR 1-4-1	273096	UCR 1-4	UCR-1#6
UCR 1-4	14	4	250	UCR 1-4-2	273515	UCR 1-4	UCR-1#6
UCR 1-4	14	4	400	UCR 1-5-1	273427	UCR 1-5	UCR-1#2
UCR 1-5	29	5	250	UCR 1-5-2	273644	UCR 1-5	UCR-1#2
UCR 1-5	29	5	400	UCR 1-6-1	273568	UCR 1-6	UCR-1#1
UCR 1-6	57	6	400	UCR 1-1-1	273232	UCR 1-1	UCR-1#7
UCR 1-6	57	6	250	UCR 1-6-2	273209	UCR 1-6	UCR-1#1

UCR 2-1	17	7	250	UCR 2-1-2	273445	UCR 2-1	UCR-1#14
UCR 2-1	17	7	400	UCR 2-2-1	273442	UCR 2-2	UCR-1#17
UCR 2-2	18	8	250	UCR 2-2-2	273429	UCR 2-2	UCR-1#17
UCR 2-2	18	8	400	UCR 2-3-1	272776	UCR 2-3	UCR-1#13
UCR 2-3	78	9	250	UCR 2-3-2	117219	UCR 2-3	UCR-1#13
UCR 2-3	78	9	400	UCR 2-4-1	273061	UCR 2-4	UCR-1#15
UCR 2-4	20	10	250	UCR 2-4-2	273555	UCR 2-4	UCR-1#15
UCR 2-4	20	10	400	UCR 2-5-1	272758	UCR 2-5	UCR-1#9
UCR 2-5	21	11	250	UCR 2-5-2	272706	UCR 2-5	UCR-1#9
UCR 2-5	21	11	400	UCR 2-6-1	272692	UCR 2-6	UCR-1#11
UCR 2-6	22	12	400	UCR 2-1-1	273135	UCR 2-1	UCR-1#14
UCR 2-6	22	12	250	UCR 2-6-2	273294	UCR 2-6	UCR-1#11

UCR 3-1	23	13	250	UCR 3-1-2	273430	UCR 3-1	UCR-1#10
UCR 3-1	23	13	500	UCR 3-2-1	273441	UCR 3-2	UCR-1#18
UCR 3-2	24	14	250	UCR 3-2-2	273533	UCR 3-2	UCR-1#18
UCR 3-2	24	14	500	UCR 3-3-1	273440	UCR 3-3	UCR-1#4
UCR 3-3	25	15	250	UCR 3-3-2	151248	UCR 3-3	UCR-1#4
UCR 3-3	25	15	500	UCR 3-4-1	272871	UCR 3-4	UCR-1#16
UCR 3-4	26	16	250	UCR 3-4-2	272679	UCR 3-4	UCR-1#16
UCR 3-4	26	16	500	UCR 3-5-1	273046	UCR 3-5	UCR-1#12
UCR 3-5	31	17	250	UCR 3-5-2	272856	UCR 3-5	UCR-1#12
UCR 3-5	31	17	500	UCR 3-6-1	273066	UCR 3-6	UCR-1#3
UCR 3-6	28	18	500	UCR 3-1-1	273460	UCR 3-1	UCR-1#10
UCR 3-6	28	18	250	UCR 3-6-2	273434	UCR 3-6	UCR-1#3

Table 4.2.1.1: Interconnection of Scintillator Modules with FEE's in UCR

4.2.2 LCR



CENTRE NATIONAL D'ETUDES SPATIALES

INTEGRAL SPECTROMETER



SPI-MU-0-1062V3-CNES
Issue : 5
Revision : 0
Date : 28/02/02
Page No. : ANX14-9

<p>DaimlerChrysler Aerospace Dornier Dornier Satellitensysteme GmbH</p>	Interconnection of Scint. Modules with FEE's	Ref.: TN-ACS-1200DS/23
		Issue: 7 Date: 31.10.2000 Page: 8 of: 20
Project: INTEGRAL - ACS		

General	AC-VCU-Conn.	AC-Seg-Conn.	ISB-VCU-Conn.	ISB-Seg-Conn.
LCR main/red.	P07/P08	P01/P02	P11/P12	P13/P14

FEE-Pos	FEE Ser. No.	FEE	Cab.L.	PMT/BGO	PMT-No.	Position	BGO-No.
LCR 1-1	56	19	200	LCR 1-1-2	273563	LCR 1-1	LCR-1#1
LCR 1-1	56	19	400	LCR 1-2-1	273389	LCR 1-2	LCR-1#4
LCR 1-2	38	20	200	LCR 1-2-2	273048	LCR 1-2	LCR-1#4
LCR 1-2	38	20	400	LCR 1-3-1	273144	LCR 1-3	LCR-1#5
LCR 1-3	32	21	200	LCR 1-3-2	273387	LCR 1-3	LCR-1#5
LCR 1-3	32	21	400	LCR 1-4-1	273353	LCR 1-4	LCR-1#3
LCR 1-4	34	22	200	LCR 1-4-2	273200	LCR 1-4	LCR-1#3
LCR 1-4	34	22	400	LCR 1-5-1	273039	LCR 1-5	LCR-1#2
LCR 1-5	35	23	200	LCR 1-5-2	273085	LCR 1-5	LCR-1#2
LCR 1-5	35	23	400	LCR 1-6-1	273255	LCR 1-6	LCR-1#6
LCR 1-6	36	24	400	LCR 1-1-1	273553	LCR 1-1	LCR-1#1
LCR 1-6	36	24	200	LCR 1-6-2	273383	LCR 1-6	LCR-1#6

LCR 2-1	37	25	200	LCR 2-1-2	273113	LCR 2-1	LCR-2#4
LCR 2-1	37	25	400	LCR 2-2-1	272837	LCR 2-2	LCR-2#1
LCR 2-2	30	26	200	LCR 2-2-2	151254	LCR 2-2	LCR-2#1
LCR 2-2	30	26	400	LCR 2-3-1	272703	LCR 2-3	LCR-2#5
LCR 2-3	40	27	200	LCR 2-3-2	273298	LCR 2-3	LCR-2#5
LCR 2-3	40	27	400	LCR 2-4-1	273092	LCR 2-4	LCR-2#6
LCR 2-4	39	28	200	LCR 2-4-2	273479	LCR 2-4	LCR-2#6
LCR 2-4	39	28	400	LCR 2-5-1	273359	LCR 2-5	LCR-2#2
LCR 2-5	46	29	200	LCR 2-5-2	273550	LCR 2-5	LCR-2#2
LCR 2-5	46	29	400	LCR 2-6-1	273542	LCR 2-6	LCR-2#3
LCR 2-6	70	30	400	LCR 2-1-1	273477	LCR 2-1	LCR-2#4
LCR 2-6	70	30	200	LCR 2-6-2	273366	LCR 2-6	LCR-2#3

LCR 3-1	47	31	200	LCR 3-1-2	273295	LCR 3-1	LCR-3#6
LCR 3-1	47	31	400	LCR 3-2-1	273416	LCR 3-2	LCR-3#5
LCR 3-2	48	32	200	LCR 3-2-2	272841	LCR 3-2	LCR-3#5
LCR 3-2	48	32	400	LCR 3-3-1	272941	LCR 3-3	LCR-3#3
LCR 3-3	53	33	200	LCR 3-3-2	272831	LCR 3-3	LCR-3#3
LCR 3-3	53	33	400	LCR 3-4-1	151263	LCR 3-4	LCR-3#1
LCR 3-4	54	34	200	LCR 3-4-2	273446	LCR 3-4	LCR-3#1
LCR 3-4	54	34	400	LCR 3-5-1	273386	LCR 3-5	LCR-3#2
LCR 3-5	55	35	200	LCR 3-5-2	273109	LCR 3-5	LCR-3#2
LCR 3-5	55	35	400	LCR 3-6-1	273107	LCR 3-6	LCR-3#4
LCR 3-6	44	36	400	LCR 3-1-1	273378	LCR 3-1	LCR-3#6
LCR 3-6	44	36	200	LCR 3-6-2	273423	LCR 3-6	LCR-3#4

Table 4.2.2.1: Redundant Interconnection of PMT's with FEE's in LCR structure

4.2.3 SSA



CENTRE NATIONAL D'ETUDES SPATIALES

INTEGRAL SPECTROMETER



SPI-MU-0-1062V3-CNES
Issue : 5
Revision : 0
Date : 28/02/02
Page No. : ANX14-10

	Interconnection of Scint. Modules with FEE's	Ref.: TN-ACS-1200DS/23
		Issue: 7 Date: 31.10.2000 Page: 9 of: 20
Project: INTEGRAL - ACS		

General	AC-VCU-Conn.	AC-Seg-Conn.	ISB-VCU-Conn.	ISB-Seg-Conn.
UCR main/red.	P07/P08	P01/P02	P13/P14	P15/P16

FEE-Pos	FEE Ser. No.	FEE	Cab.L.	PMT/BGO	PMT-No.	Position	BGO-No.
SSA 1-1	50	37	200	SS 1-1-1	273179	SSA 1-1	SS-1#4
SSA 1-1	50	37	400	SS 1-6-2	273104	SSA 1-6	SS-1#2
SSA 1-2	27	38	400	SS 1-1-2	273088	SSA 1-1	SS-1#4
SSA 1-2	27	38	200	SS 1-2-1	273123	SSA 1-2	SS-1#3
SSA 1-3	58	39	400	SS 1-2-2	273559	SSA 1-2	SS-1#3
SSA 1-3	58	39	200	SS 1-3-1	273388	SSA 1-3	SS-1#6
SSA 1-4	106	40	400	SS 1-3-2	273566	SSA 1-3	SS-1#6
SSA 1-4	106	40	200	SS 1-4-1	273514	SSA 1-4	SS-1#1
SSA 1-5	60	41	400	SS 1-4-2	273078	SSA 1-4	SS-1#1
SSA 1-5	60	41	200	SS 1-5-1	273114	SSA 1-5	SS-1#5
SSA 1-6	61	42	400	SS 1-5-2	273471	SSA 1-5	SS-1#5
SSA 1-6	61	42	200	SS 1-6-1	273535	SSA 1-6	SS-1#2
SSA 2-1	62	43	300	SS 2-1-2	273536	SSA 2-1	SS-SC-2
SSA 2-1	62	43	400	SS 2-2-1	273348	SSA 2-2	SS-2#1
SSA 2-2	90	44	300	SS 2-2-2	273548	SSA 2-2	SS-2#1
SSA 2-2	90	44	400	SS 2-3-1	273338	SSA 2-3	SS-2#2
SSA 2-3	64	45	300	SS 2-3-2	273187	SSA 2-3	SS-2#2
SSA 2-3	64	45	400	SS 2-4-1	273185	SSA 2-4	SS-2#5
SSA 2-4	65	46	300	SS 2-4-2	273081	SSA 2-4	SS-2#5
SSA 2-4	65	46	400	SS 2-5-1	273073	SSA 2-5	SS-2#4
SSA 2-5	67	47	300	SS 2-5-2	273296	SSA 2-5	SS-2#4
SSA 2-5	67	47	400	SS 2-6-1	273230	SSA 2-6	SS-2#3
SSA 2-6	68	48	400	SS 2-1-1	273332	SSA 2-1	SS-SC-2
SSA 2-6	68	48	300	SS 2-6-2	273425	SSA 2-6	SS-2#3
SSA 3-1	76	49	300	SS 3-1-1	273103	SSA 3-1	SS-SC-3
SSA 3-1	76	49	500	SS 3-6-2	273121	SSA 3-6	SS-3#3
SSA 3-2	52	50	500	SS 3-1-2	273405	SSA 3-1	SS-SC-3
SSA 3-2	52	50	300	SS 3-2-1	273468	SSA 3-2	SS-3#5
SSA 3-3	71	51	500	SS 3-2-2	273131	SSA 3-2	SS-3#5
SSA 3-3	71	51	300	SS 3-3-1	273175	SSA 3-3	SS-3#1
SSA 3-4	72	52	500	SS 3-3-2	273336	SSA 3-3	SS-3#1
SSA 3-4	72	52	300	SS 3-4-1	273290	SSA 3-4	SS-3#4
SSA 3-5	73	53	500	SS 3-4-2	273122	SSA 3-4	SS-3#4
SSA 3-5	73	53	300	SS 3-5-1	273128	SSA 3-5	SS-3#2
SSA 3-6	74	54	500	SS 3-5-2	273234	SSA 3-5	SS-3#2
SSA 3-6	74	54	300	SS 3-6-1	273134	SSA 3-6	SS-3#3

Table 4.2.3.1: Redundant Interconnection of PMT's with FEE's in SSA structure



CENTRE NATIONAL D'ETUDES SPATIALES

INTEGRAL SPECTROMETER



SPI-MU-0-1062V3-CNES

Issue : 5

Revision : 0

Date : 28/02/02

Page No. : ANX14-11

 DaimlerChrysler Aerospace Dornier Dornier Satellitensysteme GmbH	Interconnection of Scint. Modules with FEE's	Ref.: TN-ACS-1200DS/23
		Issue: 7 Date: 31.10.2000 Page: 10 of: 20
Project: INTEGRAL - ACS		

4.2.4 LVS

General	AC-VCU-Conn.	AC-Seg-Conn.	ISB-VCU-Conn.	ISB-Seg.-Conn.
UCR main/red.	P07/P08	P01/P02	P15/P16	-

FEE-Pos	FEE Ser. No.	FEE	Cab.L.	PMT/BGO	PMT-No.	Position	BGO-No.
LVS 1-1	33	55	250	RST 4-2-1	273289	RST 4-2	RST-4#2
LVS 1-1	33	55	250	RST 3-1-2	273328	RST 3-1	RST-3#1
LVS 1-2	82	56	300	RST 4-2-2	273071	RST 4-2	RST-4#2
LVS 1-2	82	56	400	RST 3-2-1	272911	RST 3-2	RST-3#2
LVS 1-3	81	57	250	RST 3-2-2	273227	RST 3-2	RST-3#2
LVS 1-3	81	57	250	RST 2-3-1	273224	RST 2-3	RST-2#3
LVS 1-4	80	58	300	RST 4-3-2	272956	RST 4-3	RST-4#3
LVS 1-4	80	58	400	RST 3-3-1	273208	RST 3-3	RST-3#3
LVS 1-5	79	59	250	RST 3-3-2	273236	RST 3-3	RST-3#3
LVS 1-5	79	59	250	RST 2-4-1	272724	RST 2-4	RST-2#4
LVS 1-6	59 (110*)	60	300	RST 4-4-2	272846	RST 4-4	RST-4#4
LVS 1-6	59 (110*)	60	400	RST 3-4-1	272684	RST 3-4	RST-3#4
LVS 1-7	115	61	250	RST 3-4-2	273408	RST 3-4	RST-3#4
LVS 1-7	115	61	250	RST 4-5-1	273483	RST 4-5	RST-4#5
LVS 1-8	49	62	300	RST 4-5-2	273475	RST 4-5	RST-4#5
LVS 1-8	49	62	400	RST 3-5-1	273350	RST 3-5	RST-3#5
LVS 1-9	27	63	250	RST 3-5-2	273278	RST 3-5	RST-3#5
LVS 1-9	27	63	250	RST 4-6-1	273320	RST 4-6	RST-4#6
LVS 1-10	69	64	300	RST 4-6-2	273426	RST 4-6	RST-4#6
LVS 1-10	69	64	400	RST 1-6-1	273398	RST 1-6	RST-1#6
LVS 1-11	42	65	250	RST 4-1-1	273374	RST 4-1	RST-4#1
LVS 1-11	42	65	250	RST 1-6-2	273343	RST 1-6	RST-1#6
LVS 1-12	41	66	300	RST 4-1-2	273397	RST 4-1	RST-4#1
LVS 1-12	41	66	400	RST 3-1-1	273454	RST 3-1	RST-3#1
LVS 2-1	83	67	500	RSP 3-3-2	273157	RSP 3-3	RSP-3#3
LVS 2-1	83	67	250	RSP 4-1-1	273189	RSP 4-1	RSP-4#1
LVS 2-2	84	68	250	RST 2-2-1	273281	RST 2-2	RST-2#2
LVS 2-2	84	68	250	RST 1-1-2	273186	RST 1-1	RST-1#1
LVS 2-3	85	69	300	RST 2-2-2	273363	RST 2-2	RST-2#2
LVS 2-3	85	69	300	RST 1-2-1	273481	RST 1-2	RST-1#2
LVS 2-4	86	70	400	RSP 5-2-1	273280	RSP 5-2	RSP-5#2
LVS 2-4	86	70	250	RSP 5-1-2	273282	RSP 5-1	RSP-5#1
LVS 2-5	91	71	250	RST 1-2-2	272838	RST 1-2	RST-1#2
LVS 2-5	91	71	300	RST 1-3-1	151266	RST 1-3	RST-1#3
LVS 2-6	94	72	400	RST 4-3-1	273154	RST 4-3	RST-4#3
LVS 2-6	94	72	300	RST 2-3-2	273480	RST 2-3	RST-2#3
LVS 2-7	95	73	400	RSP 3-2-1	273401	RSP 3-2	RSP-3#2
LVS 2-7	95	73	400	RSP 5-2-2	273399	RSP 5-2	RSP-5#2
LVS 2-8	99	74	300	RST 4-4-1	273201	RST 4-4	RST-4#4
LVS 2-8	99	74	300	RST 2-4-2	273291	RST 2-4	RST-2#4
LVS 2-9	100	75	400	RST 1-3-2	273458	RST 1-3	RST-1#3
LVS 2-9	100	75	250	RST 1-4-1	273339	RST 1-4	RST-1#4
LVS 2-10	97	76	250	RST 1-4-2	273465	RST 1-4	RST-1#4
LVS 2-10	97	76	250	RST 2-5-1	273161	RST 2-5	RST-2#5
LVS 2-11	96	77	300	RST 2-5-2	273292	RST 2-5	RST-2#5
LVS 2-11	96	77	300	RST 1-5-1	273166	RST 1-5	RST-1#5
LVS 2-12	92	78	300	RST 1-5-2	273047	RST 1-5	RST-1#5



CENTRE NATIONAL D'ETUDES SPATIALES

INTEGRAL SPECTROMETER




SPI-MU-0-1062V3-CNES
Issue : 5
Revision : 0
Date : 28/02/02
Page No. : ANX14-12

 DaimlerChrysler Aerospace Dornier Dornier Satellitensysteme GmbH	Interconnection of Scint. Modules with FEE's	Ref.: TN-ACS-1200DS/23
		Issue: 7 Date: 31.10.2000 Page: 11 of: 20
Project: INTEGRAL - ACS		

FEE-Pos	FEE Ser. No.	FEE	Cab.L.	PMT/BGO	PMT-No.	Position	BGO-No.
LVS 2-12	92	78	400	RST 2-6-1	273252	RST 2-6	RST-2#6
LVS 2-13	75	79	300	RSP 4-3-2	272888	RSP 4-3	RSP-4#3
LVS 2-13	75	79	300	RSP 5-3-1	272917	RSP 5-3	RSP-5#3
LVS 2-14	93	80	300	RST 3-6-1	273469	RST 3-6	RST-3#6
LVS 2-14	93	80	300	RST 2-6-2	273362	RST 2-6	RST-2#6
LVS 2-15	89	81	400	RST 3-6-2	272914	RST 3-6	RST-3#6
LVS 2-15	89	81	300	RST 2-1-1	273297	RST 2-1	RST-2#1
LVS 2-16	88	82	250	RST 2-1-2	273418	RST 2-1	RST-2#1
LVS 2-16	88	82	300	RST 1-1-1	273318	RST 1-1	RST-1#1
LVS 3-1	98	83	250	RSP 1-1-1	273554	RSP 1-1	RSP-1#1
LVS 3-1	98	83	250	RSP 3-1-2	273367	RSP 3-1	RSP-3#1
LVS 3-2	105	84	300	RSP 1-2-2	273162	RSP 1-2	RSP-1#2
LVS 3-2	105	84	300	RSP 4-2-1	273410	RSP 4-2	RSP-4#2
LVS 3-3	103	85	300	RSP 1-3-2	273549	RSP 1-3	RSP-1#3
LVS 3-3	103	85	250	RSP 4-3-1	273462	RSP 4-3	RSP-4#3
LVS 3-4	99	86	300	RSP 1-1-2	273191	RSP 1-1	RSP-1#1
LVS 3-4	99	86	300	RSP 1-3-1	273124	RSP 1-3	RSP-1#3
LVS 4-1	107	87	200	RSP 5-1-1	273420	RSP 5-1	RSP-5#1
LVS 4-1	107	87	200	RSP 4-1-2	273384	RSP 4-1	RSP-4#1
LVS 4-2	108	88	300	RSP 4-2-2	273558	RSP 4-2	RSP-4#2
LVS 4-2	108	88	300	RSP 3-1-1	273567	RSP 3-1	RSP-3#1
LVS 4-3	104	89	250	RSP 3-2-2	273246	RSP 3-2	RSP-3#2
LVS 4-3	104	89	400	RSP 1-2-1	273256	RSP 1-2	RSP-1#2
LVS 4-4	102		250	RSP 5-3-2	273176	RSP 5-3	RSP-5#3
LVS 4-4	102		250	RSP 3-3-1	273105	RSP 3-3	RSP-3#3

LVS 2-17	87	90	500	SCS-1	272827	SCS	SCS
LVS 2-17	87	90	HV: connector cover; Signal: not terminated, isolated cable (2x)				

Table 4.2.4.1-1: Interconnection of PMT's with FEE's in LVS

 DaimlerChrysler Aerospace Dornier Dornier Satellitensysteme GmbH	Interconnection of Scint. Modules with FEE's	Ref.: TN-ACS-1200DS/23
Project: INTEGRAL - ACS		Issue: 7 Date: 31.10.2000
		Page: 12 of: 20

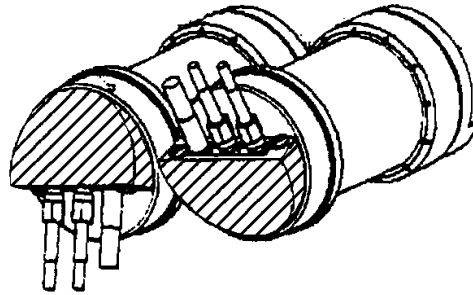
5 Orientation Scheme of PMT connectors

5.1 General

The orientation of the PMT connector bracket has to be defined prior to integration into the ACS as it cannot be changed when mounted on the PMT and the crystal.

5.2 Presentation

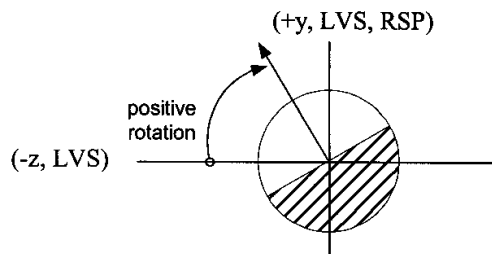
The picture aside shows how the orientation is presented in a simplified manner. The cover of the connector bracket is shown by a hatched surface. Thus the connectors are mounted from the white (non hatched) surface. This principle applies for all following figures.




5.2.1 Orientation of connectors

UCR/LCR

When looking in the direction of the PMT towards the BGO, the zero-orientation (rotation) is the vertical position of the PMT-connector bracket. A right turn is positive, a left turn negative. This applies for the UCR, LCR, SSA and LVS-RST crystals. For LVS-RSP crystals, the zero orientation is the connector bracket parallel to the system y-axis, a positive rotation from -z to +y.



 DaimlerChrysler Aerospace Dornier Dornier Satellitensysteme GmbH	Interconnection of Scint. Modules with FEE's	Ref.: TN-ACS-1200DS/23 Issue: 7 Date: 31.10.2000 Page: 13 of: 20
Project: INTEGRAL - ACS		

UCR - PMT's

The following figure and table show the orientation and orientation tolerance of the PMT's in the UCR structure:

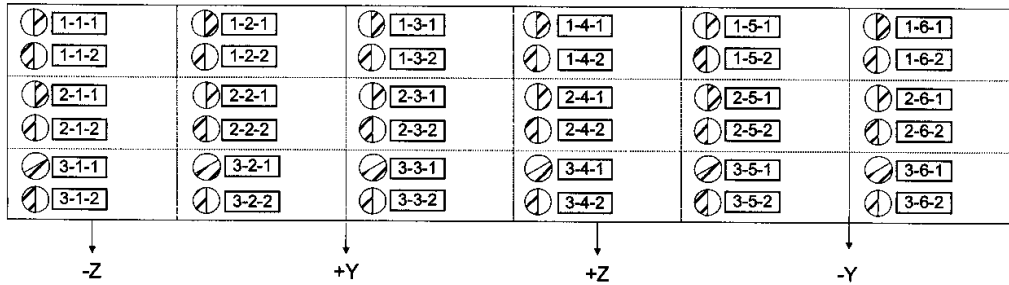



Figure 5.2.1.1: Orientation of the PMT's in the UCR

PMT-Position	PMT-Orientation (Grad)	Tolerance (Grad)
UCR 1-x-1	0	-15
UCR 1-x-2	180	+/- 15
UCR 2-x-1	0	+/- 15
UCR 2-x-2	180	+/- 15
UCR 3-x-1	67,5	+/- 7,5
UCR 3-x-2	180	- 15

Table 5.21.1: Orientation and Tolerance of the PMT's in the UCR

 DaimlerChrysler Aerospace Dornier Dornier Satellitensysteme GmbH	Interconnection of Scint. Modules with FEE's	Ref: TN-ACS-1200DS/23 Issue: 7 Date: 31.10.2000 Page: 14 of: 20
Project: INTEGRAL - ACS		

5.2.2 LCR - PMT's

The following figure and table show the orientation and orientation tolerance of the PMT's in the LCR structure:

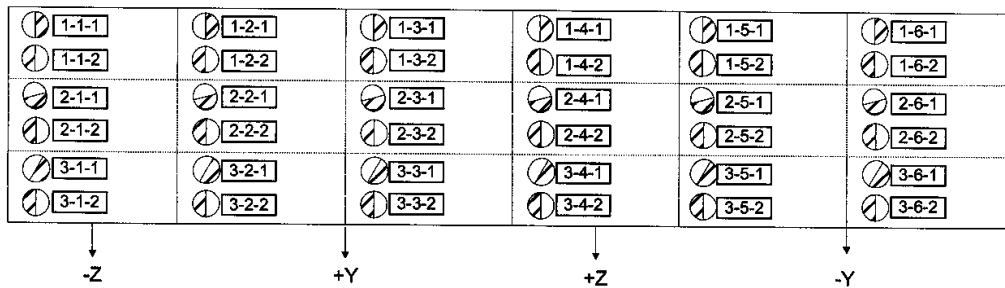



Figure 5.2.2.1 Orientation of the PMT's in the LCR

PMT-Position	PMT-Orientation (Grad)	Tolerance (Grad)
LCR 1-x-1	0	-7,5
LCR 1-x-2	180	+/- 15
LCR 2-x-1	75	+/- 5
LCR 2-x-2	180	+/- 15
LCR 3-x-1	15	+ 15
LCR 3-x-2	180	- 15

Table 5.2.2.1: Orientation and Tolerance of the PMT's in the LCR

 DaimlerChrysler Aerospace Dornier Dornier Satellitensysteme GmbH	Interconnection of Scint. Modules with FEE's	Ref.: TN-ACS-1200DS/23 Issue: 7 Date: 31.10.2000 Page: 15 of: 20
Project: INTEGRAL - ACS		

5.2.3 SSA - PMT's

The next figures show the orientation scheme of the PMT's in the SSA:

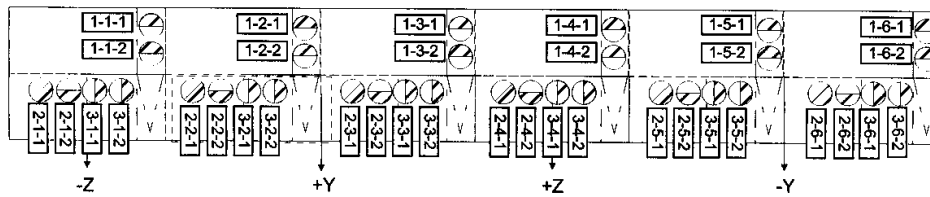



Figure 5.2.3.1: Orientation of the PMT's in the SSA

PMT-Position	PMT-Orientation (Grad)	Tolerance (Grad)
SSA 1-x-1	270 (-90)	+/- 15
SSA 1-x-2	270 (-90)	+/- 15
SSA 2-x-1	45	+/- 15
SSA 2-x-2	90	+/- 15
SSA 3-x-1	0	+/- 15
SSA 3-x-2	0	+/- 15

Table 5.2.3.1: Orientation and Tolerance of the PMT's in the SSA

 DaimlerChrysler Aerospace Dornier Dornier Satellitensysteme GmbH	Interconnection of Scint. Modules with FEE's	Ref.: TN-ACS-1200DS/23 Issue: 7 Date: 31.10.2000 Page: 16 of: 20
Project: INTEGRAL - ACS		

5.2.4 LVS - PMT's (vorläufiger Status, noch nicht an die Fertigung weitergeben!!)

The following figures show the orientation of the PMT's in the LVS structure:
 The first figures show three times two sides of the hexagon from the side (view from outside on top of the PMT's), while the last figure shows the PMT's of the center of the LVS.

5.2.4.1 Side 1

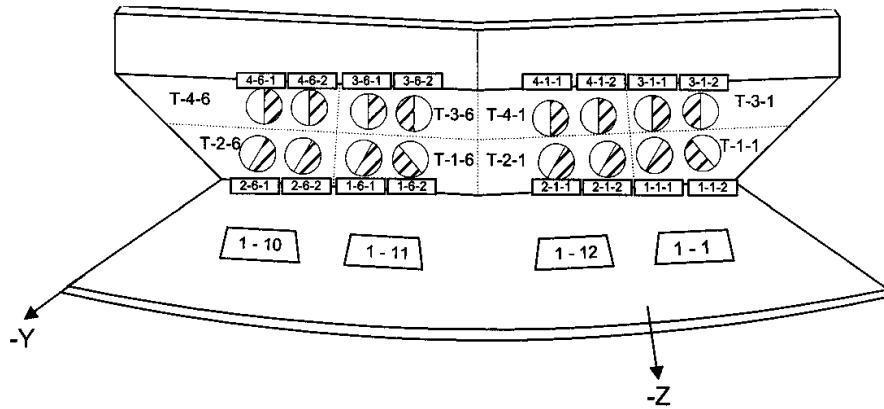



Figure 5.2.4.1.1: Orientation of the PMT's in the LVS (side 1)

PMT-Position	PMT-Orientation (Grad)	Tolerance (Grad)
T-1-6-1	30	+/- 15
T-1-6-2	140	+/- 15
T-2-6-1	30	+/- 15
T-2-6-2	30	+/- 15
T-3-6-1	0	+/- 15
T-3-6-2	180	+/- 15
T-4-6-1	0	+/- 15
T-4-6-2	0	+/- 15
T-1-1-1	30	+/- 15
T-1-1-2	140	+/- 15
T-2-1-1	30	+/- 15
T-2-1-2	30	+/- 15
T-3-1-1	0	+/- 15
T-3-1-2	180	+/- 15
T-4-1-1	0	+/- 15
T-4-1-2	0	+/- 15

Table 5.2.4.1.1: Orientation and Tolerance of the PMT's in the LVS (side 1)

 DaimlerChrysler Aerospace Dornier Dornier Satellitensysteme GmbH	Interconnection of Scint. Modules with FEE's	Ref: TN-ACS-1200DS/23
		Issue: 7 Date: 31.10.2000
Project: INTEGRAL - ACS		Page: 17 of: 20

5.2.4.2 Side 2

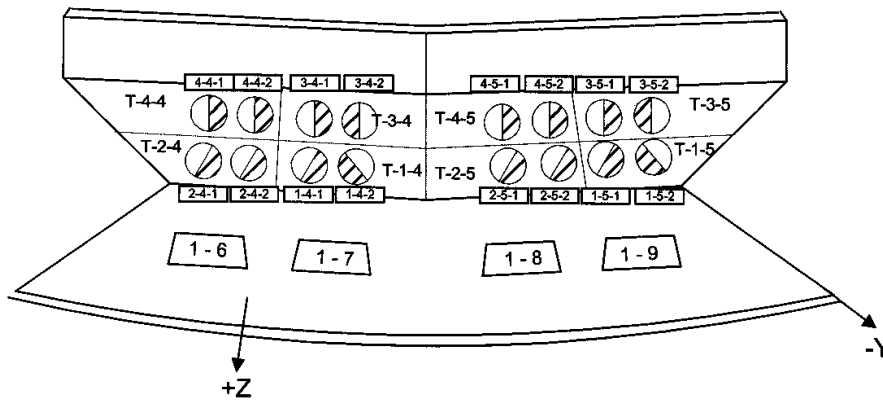



Figure 5.2.4.2.1: Orientation of the PMT's in the LVS (side 2)

PMT-Position	PMT-Orientation (Grad)	Tolerance (Grad)
T-1-4-1	30	+/- 15
T-1-4-2	140	+/- 15
T-2-4-1	30	+/- 15
T-2-4-2	30	+/- 15
T-3-4-1	0	+/- 15
T-3-4-2	180	+/- 15
T-4-4-1	0	+/- 15
T-4-4-2	0	+/- 15
T-1-5-1	30	+/- 15
T-1-5-2	140	+/- 15
T-2-5-1	30	+/- 15
T-2-5-2	30	+/- 15
T-3-5-1	0	+/- 15
T-3-5-2	180	+/- 15
T-4-5-1	0	+/- 15
T-4-5-2	0	+/- 15

Table 5.2.4.2.1: Orientation and Tolerance of the PMT's in the LVS (side 2)

5.2.4.3 Side 3

 DaimlerChrysler Aerospace Dornier Dornier Satellitensysteme GmbH	Interconnection of Scint. Modules with FEE's	Ref.: TN-ACS-1200DS/23 Issue: 7 Date: 31.10.2000 Page: 18 of: 20
Project: INTEGRAL - ACS		

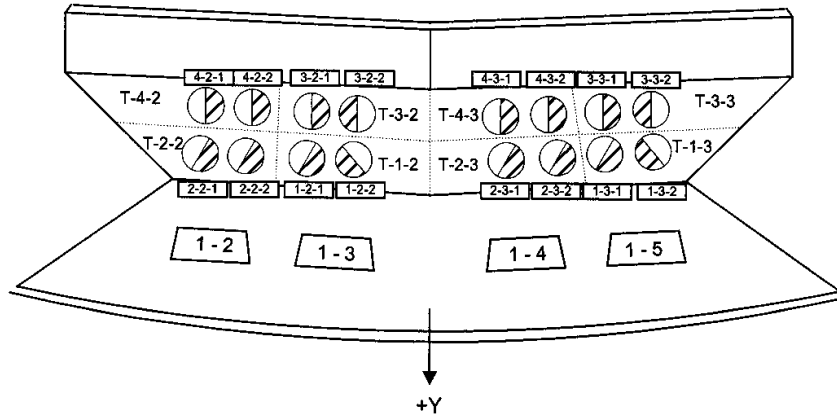

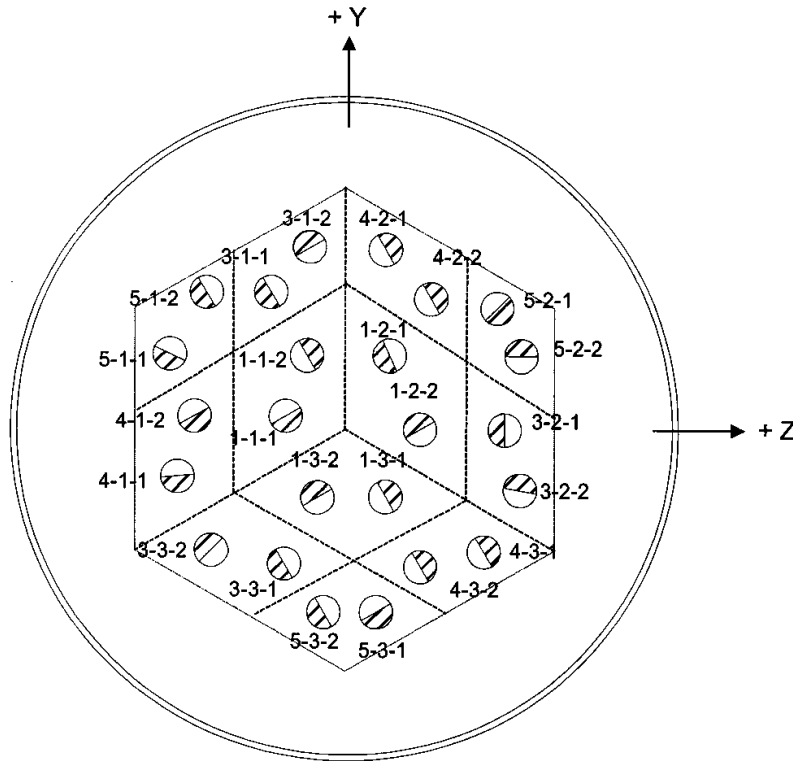


Figure 5.2.4.3.1: Orientation of the PMT's in the LVS (side 3)

PMT-Position	PMT-Orientation (Grad)	Tolerance (Grad)
T-1-2-1	30	+/- 15
T-1-2-2	140	+/- 15
T-2-2-1	30	+/- 15
T-2-2-2	30	+/- 15
T-3-2-1	0	+/- 15
T-3-2-2	180	+/- 15
T-4-2-1	0	+/- 15
T-4-2-2	0	+/- 15
T-1-3-1	30	+/- 15
T-1-3-2	140	+/- 15
T-2-3-1	30	+/- 15
T-2-3-2	30	+/- 15
T-3-3-1	0	+/- 15
T-3-3-2	180	+/- 15
T-4-3-1	0	+/- 15
T-4-3-2	0	+/- 15

Table 5.2.4.3.1: Orientation and Tolerance of the PMT's in the LVS (side 3)

 DaimlerChrysler Aerospace Domier Domier Satellitensysteme GmbH	Interconnection of Scint. Modules with FEE's	Ref.: TN-ACS-1200DS/23
		Issue: 7 Date: 31.10.2000 Page: 19 of: 20
Project: INTEGRAL - ACS		



5.2.4.4 Center

The orientation of the RSP PMT's has to be verified by trials with the harness mock up of the LVS. (expected in May 1999)

Figure 5.2.4.4.1: Orientation of the RSP-PMT's in the LVS structure (bottom)
 View from bottom in + X-direction

PMT-Position	PMT-Orientation (Grad)	Tolerance (Grad)
1-1-1	60	+/- 15
1-1-2	330	+/- 7.5
1-2-1	150	+/- 15
1-2-2	240	+/- 15
1-3-1	330	+/- 7.5
1-3-2	240	+/- 15
3-1-1	150	+/- 7.5
3-1-2	240	+/- 15
4-2-1	330	+/- 7.5
4-2-2	330	+/- 7.5



CENTRE NATIONAL D'ETUDES SPATIALES

INTEGRAL SPECTROMETER




SPI-MU-0-1062V3-CNES

Issue : 5

Revision : 0

Date : 28/02/02

Page No. : ANX14-21

 DaimlerChrysler Aerospace Dornier Dornier Satellitensysteme GmbH	Interconnection of Scint. Modules with FEE's	Ref.: TN-ACS-1200DS/23
		Issue: 7 Date: 31.10.2000
Project: INTEGRAL - ACS		Page: 20 of: 20

5-2-1	45	+/- 15
5-2-2	270	+/- 15
3-2-1	180	+/- 15
3-2-2	280	+/- 5
4-3-1	330	+/- 15
4-3-2	330	+/- 7.5
5-3-1	60	+/- 15
5-3-2	150	+/- 15
3-3-1	150	+/- 7.5
3-3-2	225	+/- 7.5
4-1-1	85	+/- 15
4-1-2	60	+/- 15
5-1-1	115	+/- 7.5
5-1-2	150	+/- 15

Table 5.2.4.3.1: Orientation and Tolerance of the PMT's in the LVS (bottom)