AMS Internal Note
ScintEle–04 v. 7.2

AMS-02 Scintillators Numbering Scheme

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Version 7.2— October 13, 2008

ABSTRACT

The AMS-02 scintillators (ACC and TOF systems) numbering scheme. Counters, channels, electronics and signals. Cable types and labelling.

Contents

1. Document history

Changes since version 7.2 (October 13, 2008)

- Update cable labels on tabulars 14, 15, 16, 17.

Changes since version 7.1 (January 24, 2008)

- Update figures 10, 11, 12, 12.

Changes since version 7.0 (January 21, 2008)

- Insert section 2.
- Update section 3.
- Update section 4.
- Update table 1 (S-Crate boards).
- Update tables 2, 3, 4, 5, 6, 7, 8, 10, 11, 12, 13 (SFET2, SFEA2 ad SFEC connections).
- Update figure 8.
- Update tables 14, 15, 16, 17.
- Update figures 10, 11, 12, 12.
- Update cable lenghs in table 21.

Changes since version 6.0 (January 9, 2008)

- Update figure 7 (SFET2 and SFEA2).

Changes since version 5.8 (April 6, 2007)

- Updated figure 8.

Changes since version 5.9 (May 28, 2007)

- Update figure 7 (SFET2 and SFEA2).

Changes since version 5.8 (April 6, 2007)

- Updated figure 8.

Changes since version 5.4 (November 10, 2006)

- New cabling of TOF 3 SFECs.
- Added S-crate front view (fig. 7).
- Added Dallas sensors placement.
- Added heaters.
- Fixed typo in TOF patch-panel 3n.
- Fixed ACC labeling on SHV2 and SHV3.
- Fixed ACC cable lengths.

Changes since version 5.3 (October 13, 2006)

- Updated figures.
- Added SPT2 bits mapping.

Changes since version 5.2 (September 19, 2006)

- Changed TDC channel assignment.
- Added cable labels.

Changes since version 5.1 (March 31, 2006)

- Added cable/connector types.
- Added cable lengths.

Changes since version 5 (March 8, 2006)

- Fixed numberig of SFEC links.
- Simplified dynode tables.

Changes since version 4 (July 5, 2005)

- New design of SFET2 and SFEA2: different connection scheme.
- Added figure with SHV HV connectors.
- Simpler names to dynodes channels.

Changes since version 3 (June 29, 2005)

- New design of SFET2 and SFEA2: different connection scheme.
- Added link number in section 4.1.
- Added SFEC channels in section 4.1.

Changes since version 2 (June 24, 2005)

- Fixed crate disposition in section **??**.
- Updated tables in sections **??** and 4.1.
- Added HT/SHT numbers in section 4.1.

Changes since version 1 (May 31, 2005)

- Swapped plane order in upper crates.
- Changed SC*n* into S*n*.

2. TOF planes orientation

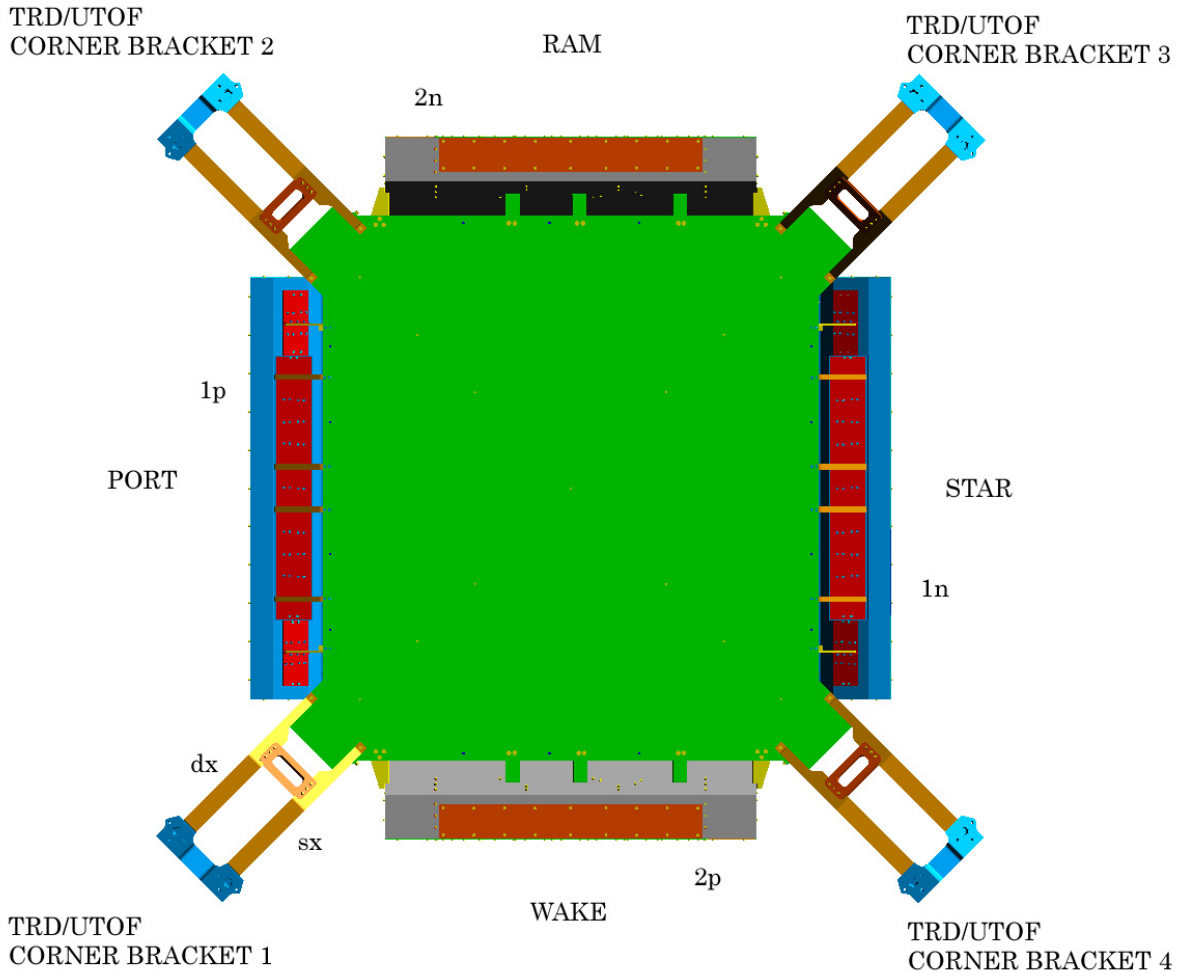


Figure 1. Upper planes orientation.

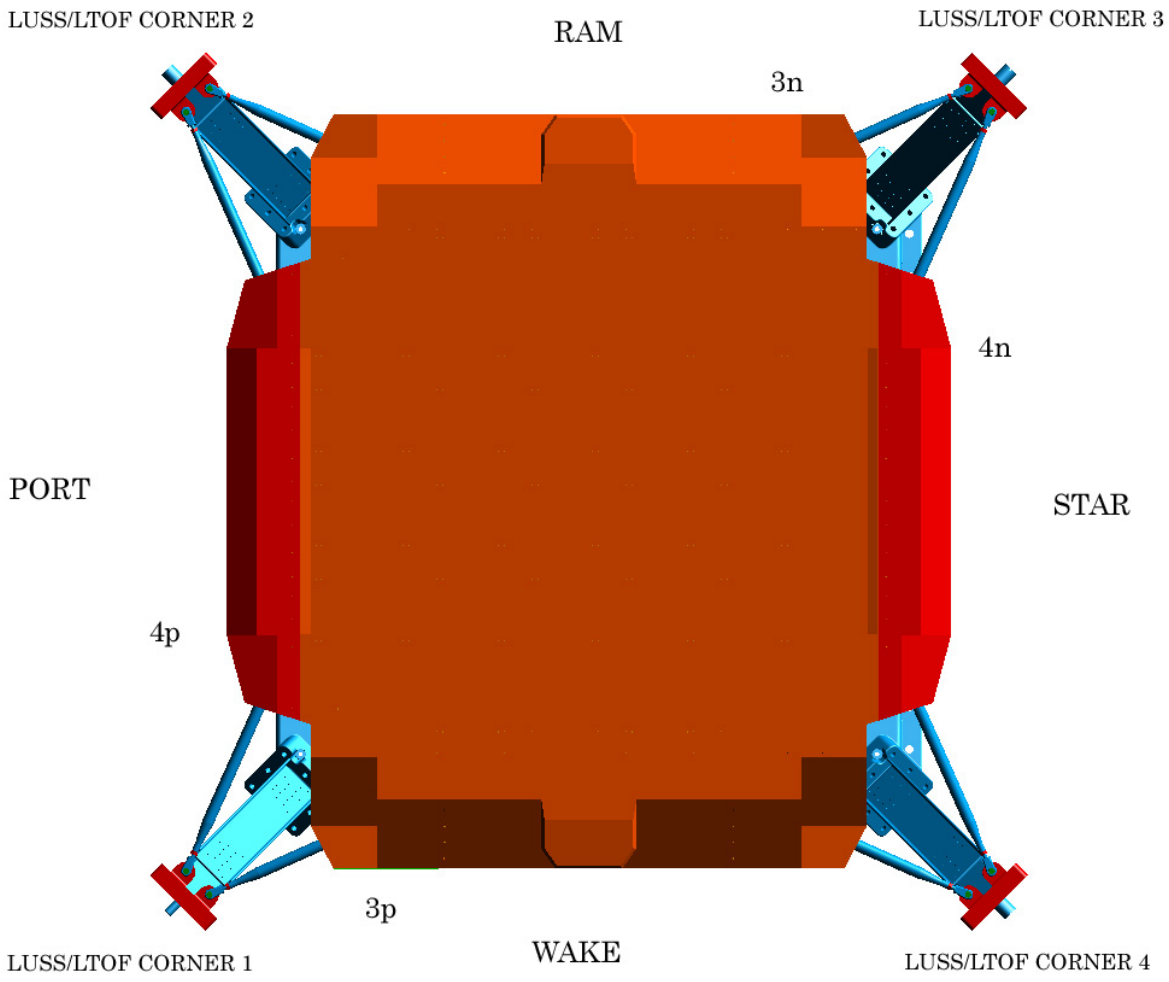


Figure 2. Lower planes orientation.

3. TOF AND ACC PHOTOMULTIPLIER TUBES NUMBERING SCHEME

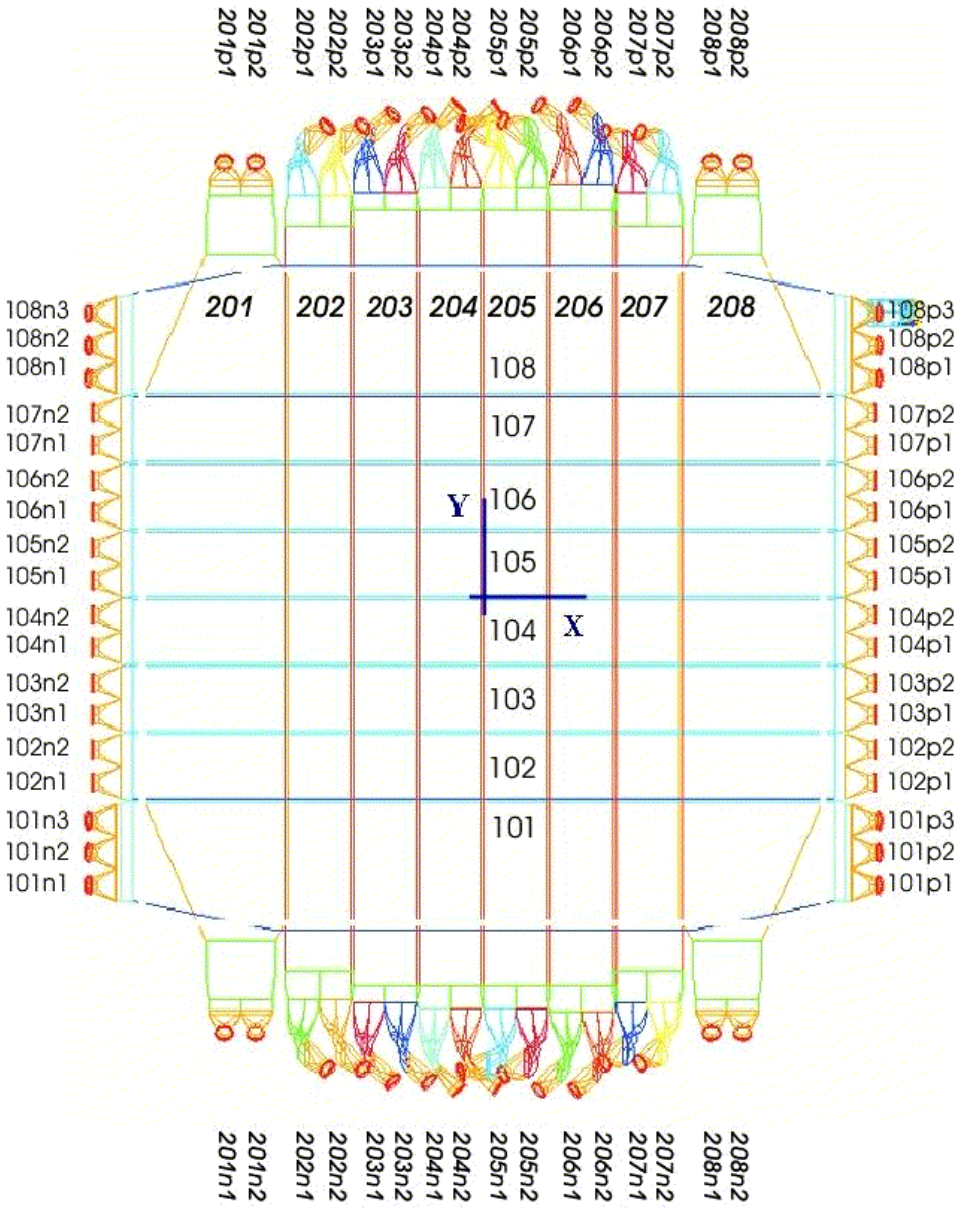


Figure 3. Upper planes (L1 and L2, starting from +Z to -Z) counters and PMTs.

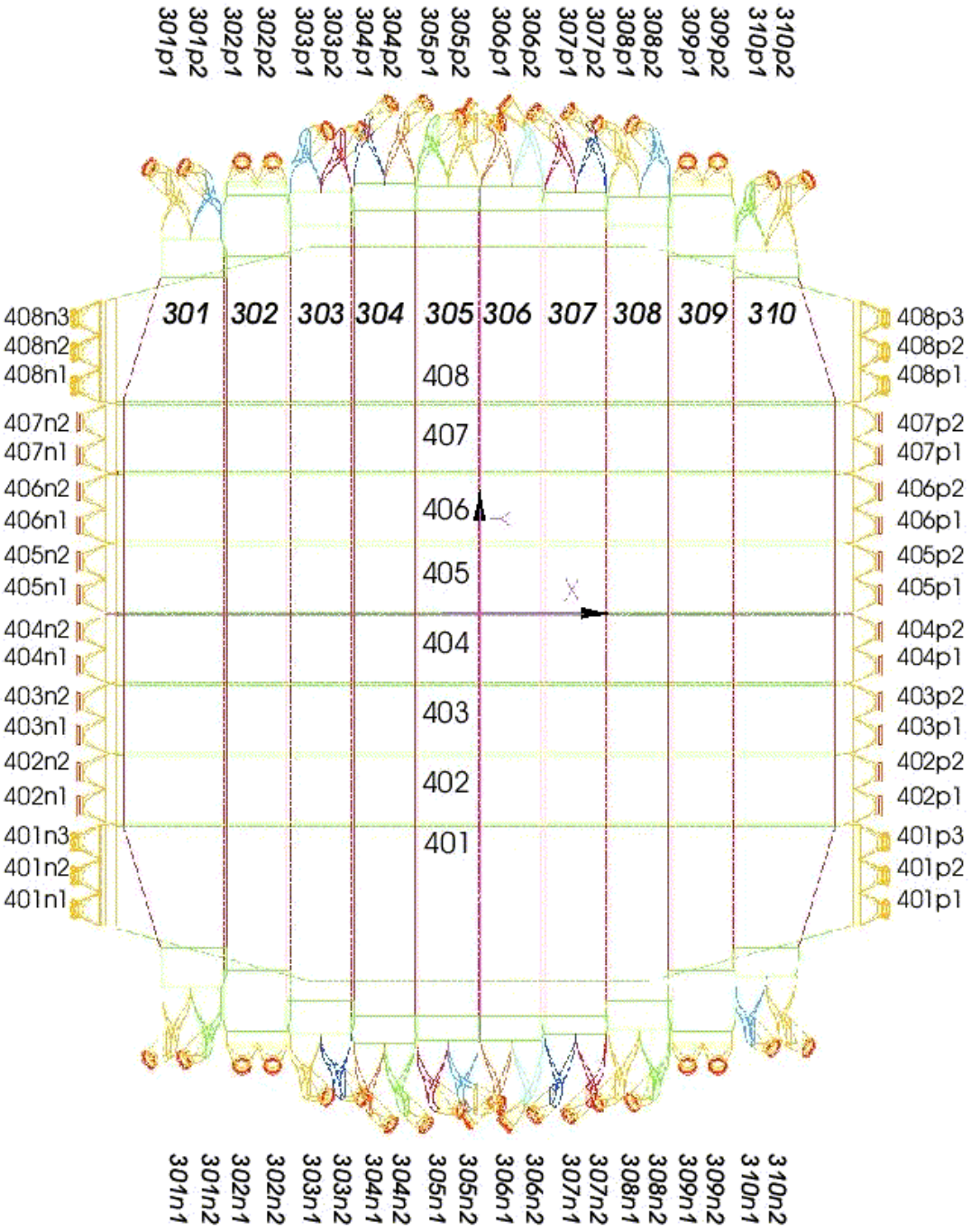


Figure 4. Lower planes (L3 and L4, starting from +Z to -Z) counters and PMTs.

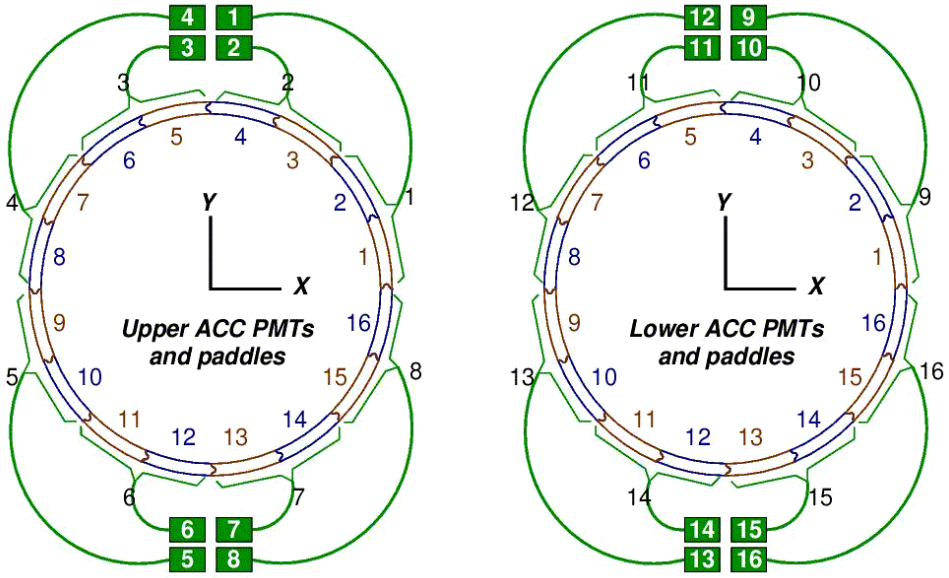


Figure 5. ACC photomultipliers scheme.

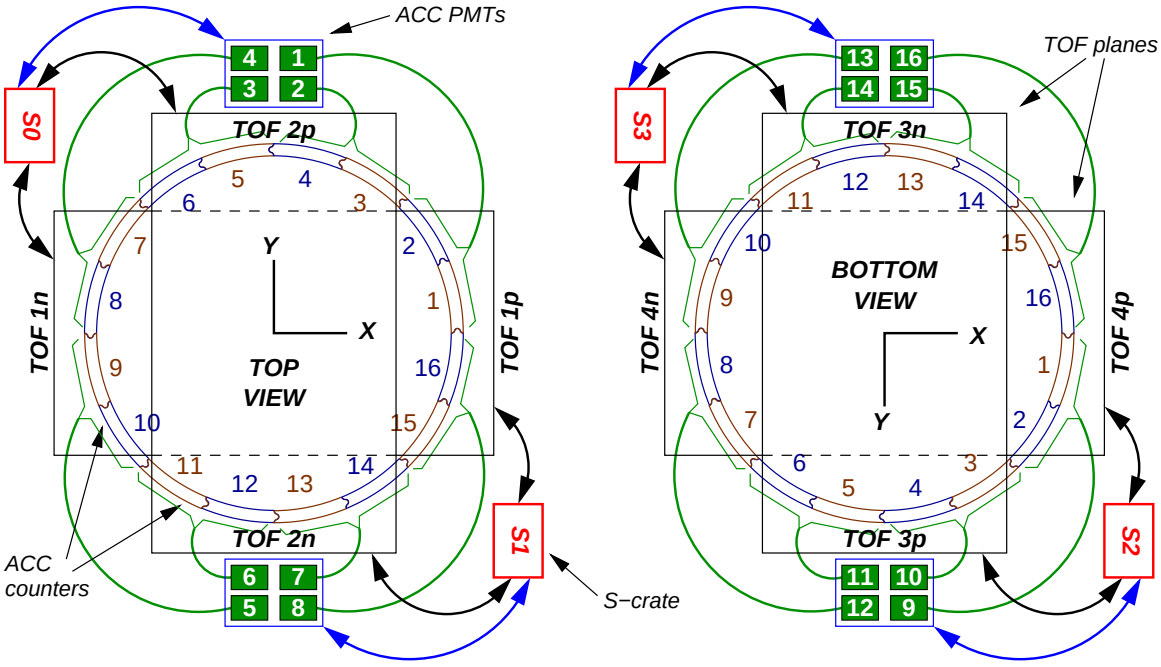
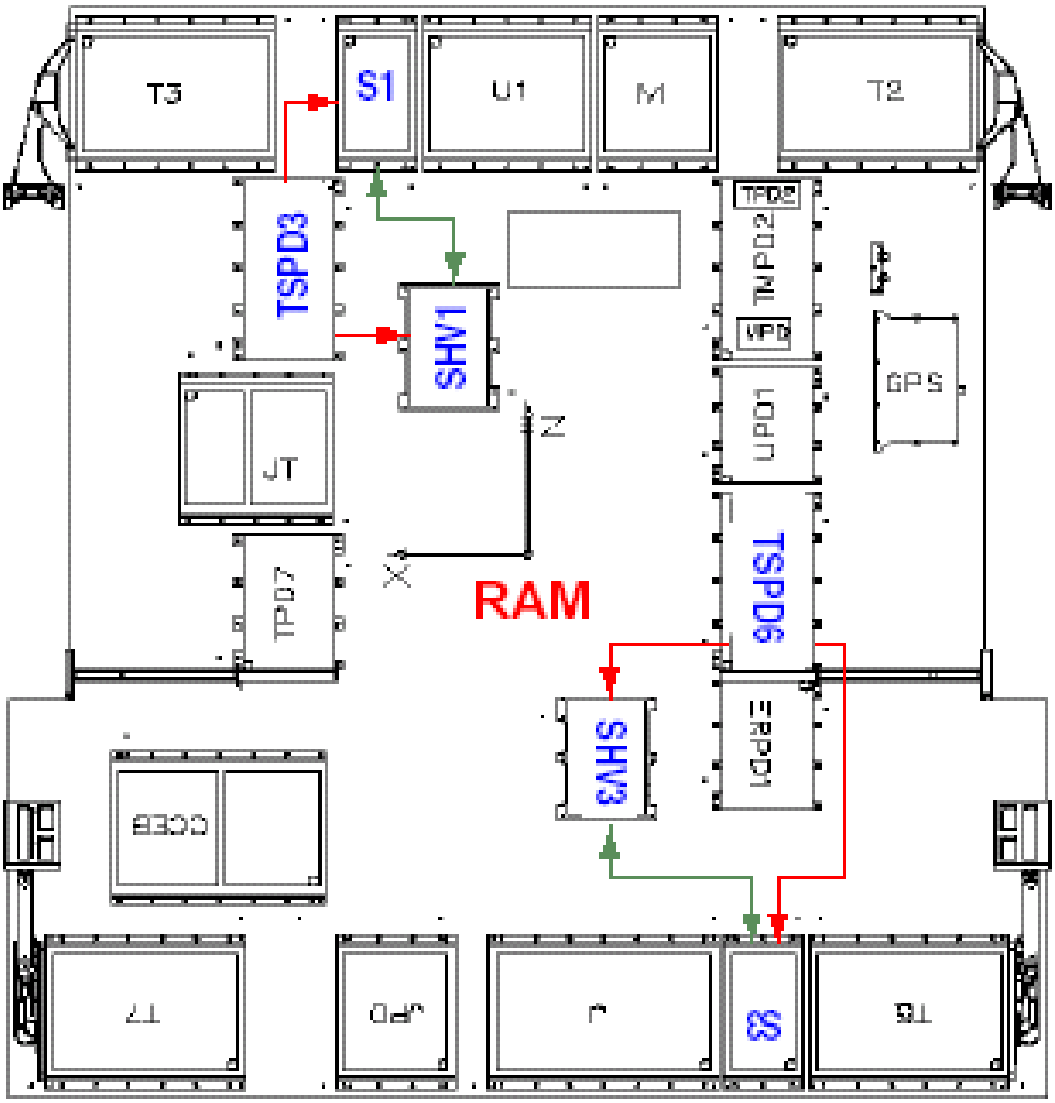
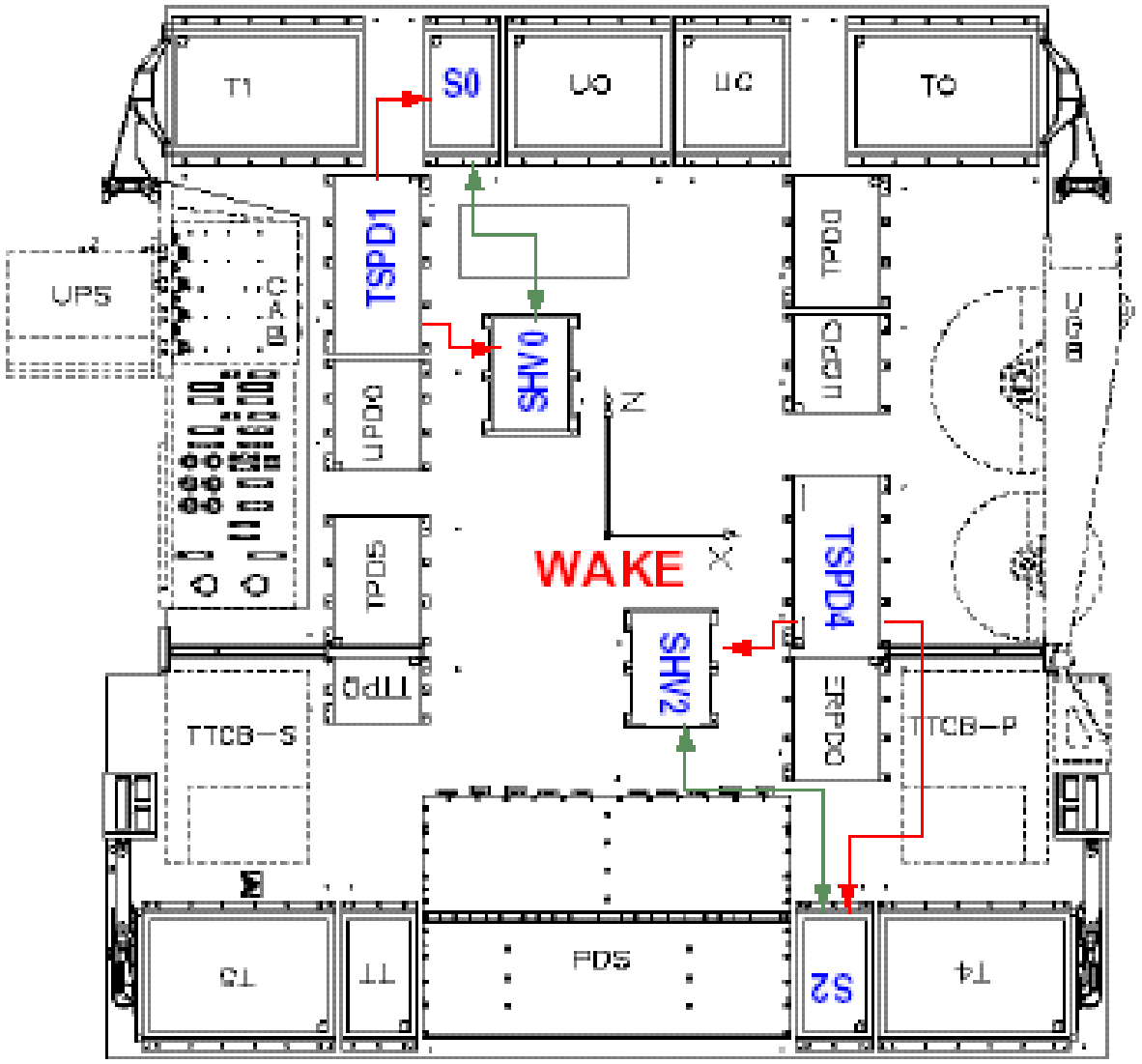


Figure 6. ACC photomultipliers associated to crates.

4. SCINTILLATOR ELECTRONICS CRATES AND HV BRICK



On RAM radiator are located S1-Crate and SHV1-brick connected to plane 1 side P and plane 2 side N, and S3-Crate and SHV3-brick connected to plane 3 side N and plane 4 side N.



On WAKE radiator are located S0-Crate and SHV0-brick connected to plane 1 side N and plane 2 side P, and S4-Crate and SHV4-brick connected to plane 3 side P and plane 4 side P.

4.1. CHANNEL ASSOCIATION WITH FRONT-END ELECTRONICS

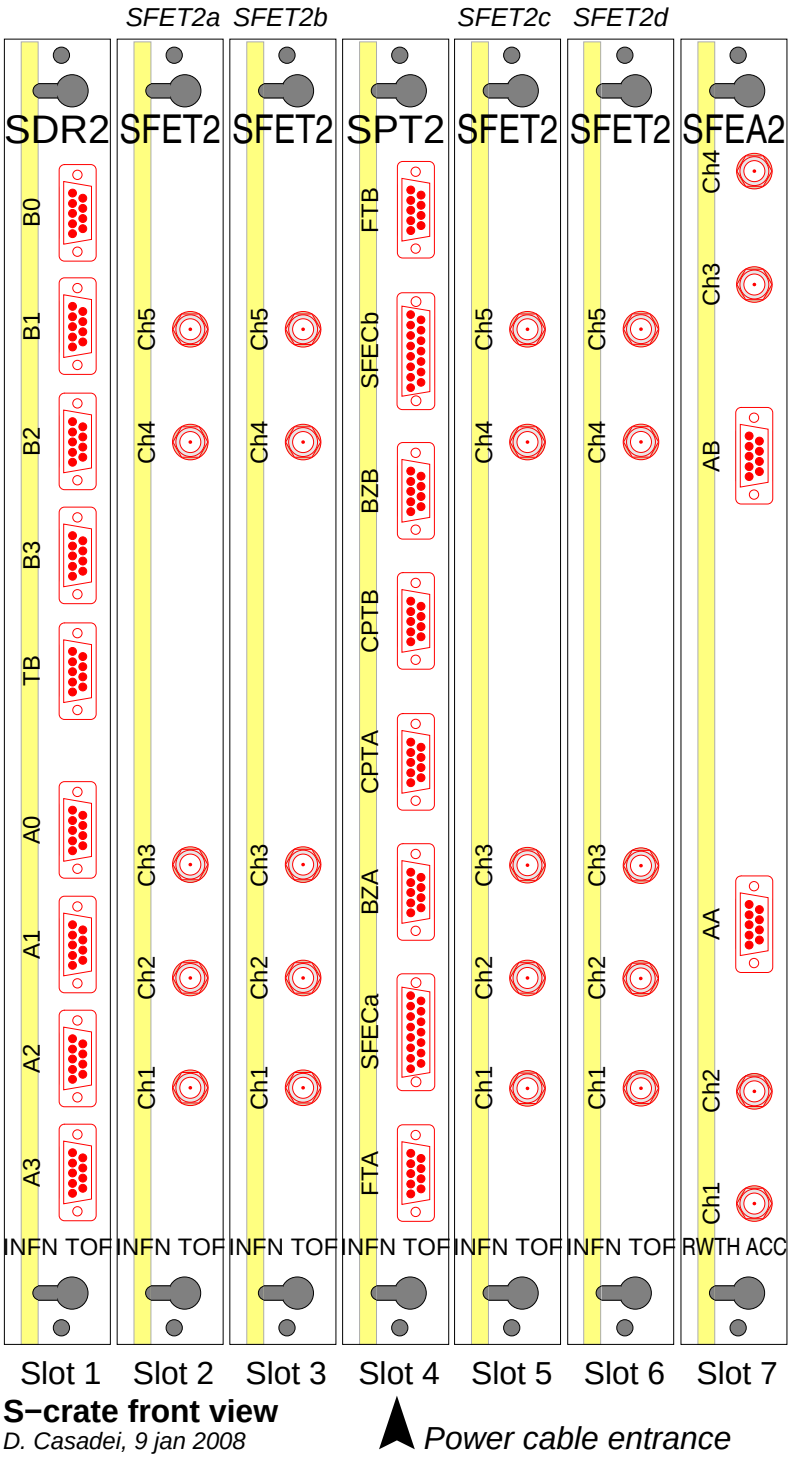


Figure 7. S-crate boards and input connector labels [2].

Slot	S0-crate Board	S1-crate Board	S2-crate Board	S3-crate Board
1	S0.SDR2	S1.SDR2	S2.SDR2	S3.SDR2
2	S0.SFET2-A	S1.SFET2-A	S2.SFET2-A	S3.SFET2-A
3	S0.SFET2-B	S1.SFET2-B	S2.SFET2-B	S3.SFET2-B
4	S0.SPT2	S1.SPT2	S2.SPT2	S3.SPT2
5	S0.SFET2-C	S1.SFET2-C	S2.SFET2-C	S3.SFET2-C
6	S0.SFET2-D	S1.SFET2-D	S2.SFET2-D	S3.SFET2-D
7	S0.SFEA2	S1.SFEA2	S2.SFEA2	S3.SFEA2
A	S0.SFEC_00	S1.SFEC_10	S2.SFEC_20	S3.SFEC_30
B	S0.SFEC_01	S1.SFEC_11	S2.SFEC_21	S3.SFEC_31

Table 1. S-Crate boards.

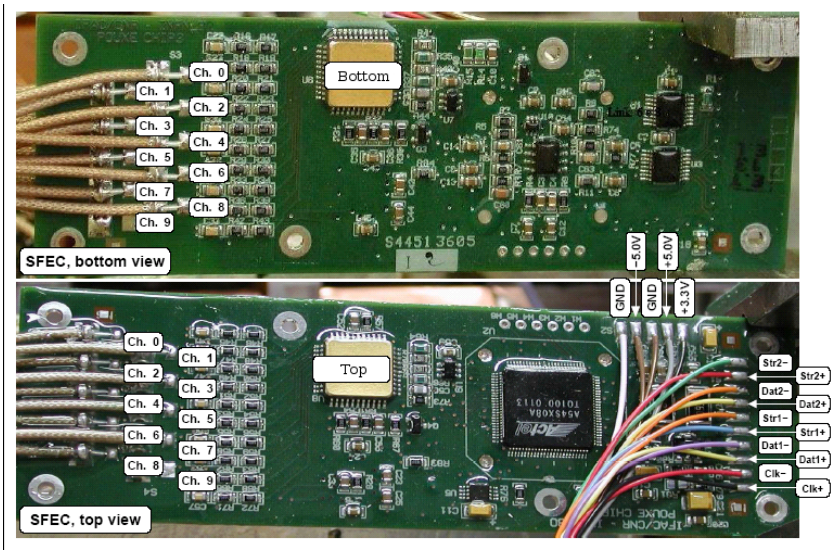


Figure 8. Top and bottom view of SFEC board connections.

S-crates have 7 slots. Each S-crate is also connected to 2 SFEC boards placed inside the TOF detector (a SFEC board with connections shown in figure 8).

In the following subsections are numerated the TOF connections to SFET2, SFEA2 and SFEC boards (for details in data format see the document [1]).

4.2. Crate S0

S0.SFET2-A			S0.SPT2	Cable labels	
TDC ch.	**Name**	**SFET2 ch.**	**(S)HT**	**Crate side**	**Detector side**
0	101n	1	(S)HT0	S0.SFET2a.1	101n
1	103n	2	(S)HT1	S0.SFET2a.2	103n
2	105n	3	(S)HT2	S0.SFET2a.3	105n
3	107n	4	(S)HT3	S0.SFET2a.4	107n
4	—	—	—		
5	FT	—			
6	sum(HT)	—			
7	sum(SHT)	—			

S0.SFET2-B			S0.SPT2	Cable labels	
TDC ch.	**Name**	**SFET2 ch.**	**(S)HT**	**Crate side**	**Detector side**
0	102n	1	(S)HT5	S0.SFET2b.1	102n
1	104n	2	(S)HT6	S0.SFET2b.2	104n
2	106n	3	(S)HT7	S0.SFET2b.3	106n
3	108n	4	(S)HT8	S0.SFET2b.4	108n
4	—	—	—		
5	FT	—			
6	sum(HT)	—			
7	sum(SHT)	—			

S0.SFET2-C			S0.SPT2	Cable labels	
TDC ch.	**Name**	**SFET2 ch.**	**(S)HT**	**Crate side**	**Detector side**
0	201p	1	(S)HT10	S0.SFET2c.1	201p
1	203p	2	(S)HT11	S0.SFET2c.2	203p
2	205p	3	(S)HT12	S0.SFET2c.3	205p
3	207p	4	(S)HT13	S0.SFET2c.4	207p
4	—	—	—		
5	FT	—			
6	sum(HT)	—			
7	sum(SHT)	—			

S0.SFET2-D			S0.SPT2	Cable labels	
TDC ch.	Name	SFET2 ch.	(S)HT	Crate side	Detector side
0	202p	1	(S)HT15	S0.SFET2d.1	202p
1	204p	2	(S)HT16	S0.SFET2d.2	204p
2	206p	3	(S)HT17	S0.SFET2d.3	206p
3	208p	4	(S)HT18	S0.SFET2d.4	208p
4	—	—	—		
5	FT	—			
6	sum(HT)	—			
7	sum(SHT)	—			

Table 2. SFET2 connections.

S0.SFEA2		Cable labels	
TDC ch.	Name	Crate side	Detector side
0	ACC01	S0.SFEA2.1	ACC01
1	ACC02	S0.SFEA2.2	ACC02
2	ACC03	S0.SFEA2.3	ACC03
3	ACC04	S0.SFEA2.4	ACC04
4	—		
5	FT		
6	—		
7	—		

Table 3. SFEA connections.

S0.SFEC_00 (S0.SFEC-A)						S0.SFEC_01 (S0.SFEC-B)					
Side	Channel		Side	Channel		Side	Channel		Side	Channel	
	No.	Name		No.	Name		No.	Name		No.	Name
Bottom	0	101n1	Top	0	101n2	Bottom	0	201p1	Top	0	201p2
	1	102n1		1	102n2		1	202p1		1	202p2
	2	103n1		2	103n2		2	203p1		2	203p2
	3	104n1		3	104n2		3	204p1		3	204p2
	4	105n1		4	105n2		4	205p1		4	205p2
	5	106n1		5	106n2		5	206p1		5	206p2
	6	107n1		6	107n2		6	207p1		6	207p2
	7	108n1		7	108n2		7	208p1		7	208p2
	8	101n3		8	108n3		8	—		8	—
	9	—		9	—		9	—		9	—

Table 4. SFEC connections.

4.3. Crate S1

S1.SFET2A			S1.SPT2	Cable labels	
TDC ch.	**Name**	**SFET2 ch.**	**(S)HT**	**Crate side**	**Detector side**
0	101p	1	(S)HT0	S1.SFET2a.1	101p
1	103p	2	(S)HT1	S1.SFET2a.2	103p
2	105p	3	(S)HT2	S1.SFET2a.3	105p
3	107p	4	(S)HT3	S1.SFET2a.4	107p
4	—	—	—		
5	FT	—			
6	sum(HT)	—			
7	sum(SHT)	—			

S1.SFET2-B			S1.SPT2	Cable labels	
TDC ch.	**Name**	**SFET2 ch.**	**(S)HT**	**Crate side**	**Detector side**
0	102p	1	(S)HT5	S1.SFET2b.1	102p
1	104p	2	(S)HT6	S1.SFET2b.2	104p
2	106p	3	(S)HT7	S1.SFET2b.3	106p
3	108p	4	(S)HT8	S1.SFET2b.4	108p
4	—	—	—		
5	FT	—			
6	sum(HT)	—			
7	sum(SHT)	—			

S1.SFET2-C			S1.SPT2	Cable labels	
TDC ch.	**Name**	**SFET2 ch.**	**(S)HT**	**Crate side**	**Detector side**
0	201n	1	(S)HT10	S1.SFET2c.1	201n
1	203n	2	(S)HT11	S1.SFET2c.2	203n
2	205n	3	(S)HT12	S1.SFET2c.3	205n
3	207n	4	(S)HT13	S1.SFET2c.4	207n
4	—	—	—		
5	FT	—			
6	sum(HT)	—			
7	sum(SHT)	—			

S1.SFET2-D			S1.SPT2	Cable labels	
TDC ch.	Name	SFET2 ch.	(S)HT	Crate side	Detector side
0	202n	1	(S)HT15	S1.SFET2d.1	202n
1	204n	2	(S)HT16	S1.SFET2d.2	204n
2	206n	3	(S)HT17	S1.SFET2d.3	206n
3	208n	4	(S)HT18	S1.SFET2d.4	208n
4	—	—	—		
5	FT	—			
6	sum(HT)	—			
7	sum(SHT)	—			

Table 5. SFET2 connections.

S1.SFEA2		Cable labels	
TDC ch.	Name	Crate side	Detector side
0	ACC05	S1.SFEA2.1	ACC05
1	ACC06	S1.SFEA2.2	ACC06
2	ACC07	S1.SFEA2.3	ACC07
3	ACC08	S1.SFEA2.4	ACC08
4	—		
5	FT		
6	—		
7	—		

Table 6. SFEA2 connections.

S1.SFEC_10 (S1.SFEC-A)						S1.SFEC_11 (S1.SFEC-B)					
Side	Channel		Side	Channel		Side	Channel		Side	Channel	
	No.	Name		No.	Name		No.	Name		No.	Name
Bottom	0	101p1	Top	0	101p2	Bottom	0	201n1	Top	0	201n2
	1	102p1		1	102p2		1	202n1		1	202n2
	2	103p1		2	103p2		2	203n1		2	203n2
	3	104p1		3	104p2		3	204n1		3	204n2
	4	105p1		4	105p2		4	205n1		4	205n2
	5	106p1		5	106p2		5	206n1		5	206n2
	6	107p1		6	107p2		6	207n1		6	207n2
	7	108p1		7	108p2		7	208n1		7	208n2
	8	101p3		8	108p3		8	—		8	—
	9	—		9	—		9	—		9	—

Table 7. SFEC connections.

4.4. Crate S2

S2.SFET2-A			S2.SPT2	Cable labels	
TDC ch.	**Name**	**SFET2 ch.**	**(S)HT**	**Crate side**	**Detector side**
0	401p	1	(S)HT0	S2.SFET2a.1	401p
1	403p	2	(S)HT1	S2.SFET2a.2	403p
2	405p	3	(S)HT2	S2.SFET2a.3	405p
3	407p	4	(S)HT3	S2.SFET2a.4	407p
4	—	—	—	—	
5	FT	—			
6	sum(HT)	—			
7	sum(SHT)	—			

S2.SFET2-B			S2.SPT2	Cable labels	
TDC ch.	**Name**	**SFET2 ch.**	**(S)HT**	**Crate side**	**Detector side**
0	402p	1	(S)HT5	S2.SFET2b.1	402p
1	404p	2	(S)HT6	S2.SFET2b.2	404p
2	406p	3	(S)HT7	S2.SFET2b.3	406p
3	408p	4	(S)HT8	S2.SFET2b.4	408p
4	—	—	—	—	—
5	FT	—			
6	sum(HT)	—			
7	sum(SHT)	—			

S2.SFET2-C			S2.SPT2	Cable labels	
TDC ch.	**Name**	**SFET2 ch.**	**(S)HT**	**Crate side**	**Detector side**
0	301p	1	(S)HT10	S2.SFET2c.1	301p
1	303p	2	(S)HT11	S2.SFET2c.2	303p
2	305p	3	(S)HT12	S2.SFET2c.3	305p
3	307p	4	(S)HT13	S2.SFET2c.4	307p
4	309p	5	(S)HT14	S2.SFET2c.5	309p
5	FT	—			
6	sum(HT)	—			
7	sum(SHT)	—			

S2.SFET2-D			S2.SPT2	Cable labels	
TDC ch.	Name	SFET2 ch.	(S)HT	Crate side	Detector side
0	302p	1	(S)HT15	S2.SFET2d.1	302p
1	304p	2	(S)HT16	S2.SFET2d.2	304p
2	306p	3	(S)HT17	S2.SFET2d.3	306p
3	308p	4	(S)HT18	S2.SFET2d.4	308p
4	310p	5	(S)HT19	S2.SFET2d.5	310p
5	FT	—			
6	sum(HT)	—			
7	sum(SHT)	—			

Table 8. SFET2 connections.

S2.SFEA2		Cable labels	
TDC ch.	Name	Crate side	Detector side
0	ACC09	S2.SFEA2.1	ACC09
1	ACC10	S2.SFEA2.2	ACC10
2	ACC11	S2.SFEA2.3	ACC11
3	ACC12	S2.SFEA2.4	ACC12
4	—		
5	FT		
6	—		
7	—		

Table 9. SFEA2 connections.

S2.SFEC_20 (S2.SFEC-A)						S2.SFEC_21 (S2.SFEC-B)					
Side	Channel		Side	Channel		Side	Channel		Side	Channel	
	No.	Name		No.	Name		No.	Name		No.	Name
Bottom	0	301p2	Top	0	301p1	Bottom	0	401p1	Top	0	401p2
	1	302p2		1	302p1		1	402p1		1	402p2
	2	303p2		2	303p1		2	403p1		2	403p2
	3	304p2		3	304p1		3	404p1		3	404p2
	4	305p2		4	305p1		4	405p1		4	405p2
	5	306p2		5	306p1		5	406p1		5	406p2
	6	307p2		6	307p1		6	407p1		6	407p2
	7	308p2		7	308p1		7	408p1		7	408p2
	8	309p2		8	309p1		8	401p3		8	408p3
	9	310p2		9	310p1		9	—		9	—

Table 10. SFEC connections.

4.5. Crate S3

S3.SFET2-A			S3.SPT2	Cable labels	
TDC ch.	Name	SFET2 ch.	(S)HT	Crate side	Detector side
0	401n	1	(S)HT0	S3.SFET2a.1	401n
1	403n	2	(S)HT1	S3.SFET2a.2	403n
2	405n	3	(S)HT2	S3.SFET2a.3	405n
3	407n	4	(S)HT3	S3.SFET2a.4	407n
4	—	—	—	—	—
5	FT	—			
6	sum(HT)	—			
7	sum(SHT)	—			

S3.SFET2-B			S3.SPT2	Cable labels	
TDC ch.	Name	SFET2 ch.	(S)HT	Crate side	Detector side
0	402n	1	(S)HT5	S3.SFET2b.1	402n
1	404n	2	(S)HT6	S3.SFET2b.2	404n
2	406n	3	(S)HT7	S3.SFET2b.3	406n
3	408n	4	(S)HT8	S3.SFET2b.4	408n
4	—	—	—	—	—
5	FT	—			
6	sum(HT)	—			
7	sum(SHT)	—			

S3.SFET2-C			S3.SPT2	Cable labels	
TDC ch.	Name	SFET2 ch.	(S)HT	Crate side	Detector side
0	301n	1	(S)HT10	S3.SFET2c.1	301n
1	303n	2	(S)HT11	S3.SFET2c.2	303n
2	305n	3	(S)HT12	S3.SFET2c.3	305n
3	307n	4	(S)HT13	S3.SFET2c.4	307n
4	309n	5	(S)HT14	S3.SFET2c.5	309n
5	FT	—			
6	sum(HT)	—			
7	sum(SHT)	—			

S3.SFET2-D			S3.SPT2	Cable labels	
TDC ch.	Name	SFET2 ch.	(S)HT	Crate side	Detector side
0	302n	1	(S)HT15	S3.SFET2d.1	302n
1	304n	2	(S)HT16	S3.SFET2d.2	304n
2	306n	3	(S)HT17	S3.SFET2d.3	306n
3	308n	4	(S)HT18	S3.SFET2d.4	308n
4	310n	5	(S)HT19	S3.SFET2d.5	310n
5	FT	—			
6	sum(HT)	—			
7	sum(SHT)	—			

Table 11. SFET2 connections.

S3.SFEA2		Cable labels	
TDC ch.	Name	Crate side	Detector side
0	ACC13	S3.SFEA2.1	ACC13
1	ACC14	S3.SFEA2.2	ACC14
2	ACC15	S3.SFEA2.3	ACC15
3	ACC16	S3.SFEA2.4	ACC16
4	—		
5	FT		
6	—		
7	—		

Table 12. SFEA2 connections.

S3.SFEC_30 (S3.SFEC-A)						S3.SFEC_31 (S3.SFEC-B)					
Side	Channel		Side	Channel		Side	Channel		Side	Channel	
	No.	Name		No.	Name		No.	Name		No.	Name
Bottom	0	301n2	Top	0	301n1	Bottom	0	401n1	Top	0	401n2
	1	302n2		1	302n1		1	402n1		1	402n2
	2	303n2		2	303n1		2	403n1		2	403n2
	3	304n2		3	304n1		3	404n1		3	404n2
	4	305n2		4	305n1		4	405n1		4	405n2
	5	306n2		5	306n1		5	406n1		5	406n2
	6	307n2		6	307n1		6	407n1		6	407n2
	7	308n2		7	308n1		7	408n1		7	408n2
	8	309n2		8	309n1		8	401n3		8	408n3
	9	310n2		9	310n1		9	—		9	—

Table 13. SFEC connections.

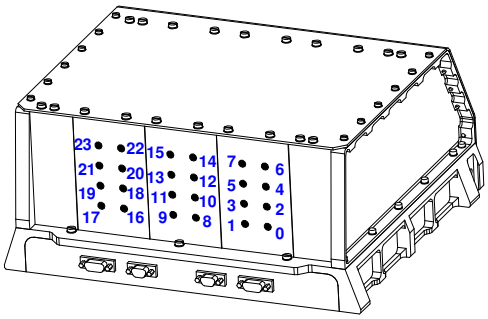


Figure 9. SHV HV outputs numbering scheme.

4.6. High-voltage channels

SHV0 (controlled from S0)		Detector	Cable labels		
HV channel	PMTs	TOF panel	SHV side	Middle	PMT side
0	101n1	HV1	SHV-801	1n	SHV-801
1	101n2 + 108n2	HV2	SHV-802	1n	SHV-802
2	101n3 + 108n1	HV3	SHV-803	1n	SHV-803
3	102n1 + 107n2	HV4	SHV-804	1n	SHV-804
4	102n2 + 107n1	HV5	SHV-805	1n	SHV-805
5	103n1 + 106n2	HV6	SHV-806	1n	SHV-806
6	103n2 + 106n1	HV7	SHV-807	1n	SHV-807
7	104n1 + 105n2	HV8	SHV-808	1n	SHV-808
8	104n2 + 105n1	HV9	SHV-809	1n	SHV-809
9	108n3	HV10	SHV-810	1n	SHV-810
10	201p1 + 208p2	HV1	SHV-401	2p	SHV-401
11	201p2 + 208p1	HV2	SHV-402	2p	SHV-402
12	202p1 + 207p2	HV3	SHV-403	2p	SHV-403
13	202p2 + 207p1	HV4	SHV-404	2p	SHV-404
14	203p1 + 206p2	HV5	SHV-405	2p	SHV-405
15	203p2 + 206p1	HV6	SHV-406	2p	SHV-406
16	204p1	HV7	SHV-407	2p	SHV-407
17	204p2	HV8	SHV-408	2p	SHV-408
18	205p1	HV9	SHV-409	2p	SHV-409
19	205p2	HV10	SHV-410	2p	SHV-410
20	ACC01	—	SHV0.20		ACC01
21	ACC02	—	SHV0.21		ACC02
22	ACC03	—	SHV0.22		ACC03
23	ACC04	—	SHV0.23		ACC04

Table 14. SHV0 connections.

SHV1 (controlled from S1)		**Detector**	**Cable labels**		
HV channel	PMTs	TOF panel	SHV side	Middle	PMT side
0	101p1	HV1	SHV-701	1p	SHV-701
1	101p2 + 108p2	HV2	SHV-702	1p	SHV-702
2	101p3 + 108p1	HV3	SHV-703	1p	SHV-703
3	102p1 + 107p2	HV4	SHV-704	1p	SHV-704
4	102p2 + 107p1	HV5	SHV-705	1p	SHV-705
5	103p1 + 106p2	HV6	SHV-706	1p	SHV-706
6	103p2 + 106p1	HV7	SHV-707	1p	SHV-707
7	104p1 + 105p2	HV8	SHV-708	1p	SHV-708
8	104p2 + 105p1	HV9	SHV-709	1p	SHV-709
9	108p3	HV10	SHV-710	1p	SHV-710
10	201n1 + 208n2	HV1	SHV-301	2n	SHV-301
11	201n2 + 208n1	HV2	SHV-302	2n	SHV-302
12	202n1 + 207n2	HV3	SHV-303	2n	SHV-303
13	202n2 + 207n1	HV4	SHV-304	2n	SHV-304
14	203n1 + 206n2	HV5	SHV-305	2n	SHV-305
15	203n2 + 206n1	HV6	SHV-306	2n	SHV-306
16	204n1	HV7	SHV-307	2n	SHV-307
17	204n2	HV8	SHV-308	2n	SHV-308
18	205n1	HV9	SHV-309	2n	SHV-309
19	205n2	HV10	SHV-310	2n	SHV-310
20	ACC05	—	SHV1.20		ACC05
21	ACC06	—	SHV1.21		ACC06
22	ACC07	—	SHV1.22		ACC07
23	ACC08	—	SHV1.23		ACC08

Table 15. SHV1 connections.

SHV2 (controlled from S2)		Detector	Cable labels		
HV channel	PMTs	TOF panel	SHV side	Middle	PMT side
0	301p1 + 310p2	HV1	SHV-201	3p	SHV-201
1	301p2	HV6	SHV-202	3p	SHV-202
2	302p1 + 309p2	HV3	SHV-203	3p	SHV-203
3	302p2 + 309p1	HV4	SHV-204	3p	SHV-204
4	303p1 + 308p2	HV5	SHV-205	3p	SHV-205
5	303p2 + 308p1	HV7	SHV-206	3p	SHV-206
6	304p1 + 307p2	HV8	SHV-207	3p	SHV-207
7	304p2 + 307p1	HV9	SHV-208	3p	SHV-208
8	305p1 + 306p2	HV10	SHV-209	3p	SHV-209
9	305p2 + 306p1	HV11	SHV-210	3p	SHV-210
10	310p1	HV2	SHV-211	3p	SHV-211
11	401p1 + 408p3	HV8	SHV-601	4p	SHV-601
12	401p2 + 408p2	HV3	SHV-602	4p	SHV-602
13	401p3 + 408p1	HV1	SHV-603	4p	SHV-603
14	402p1 + 407p2	HV7	SHV-604	4p	SHV-604
15	402p2 + 407p1	HV9	SHV-605	4p	SHV-605
16	403p1 + 406p2	HV4	SHV-606	4p	SHV-606
17	403p2 + 406p1	HV5	SHV-607	4p	SHV-607
18	404p1 + 405p2	HV6	SHV-608	4p	SHV-608
19	404p2 + 405p1	HV2	SHV-609	4p	SHV-609
20	ACC09	—	SHV2.20		ACC09
21	ACC10	—	SHV2.21		ACC10
22	ACC11	—	SHV2.22		ACC11
23	ACC12	—	SHV2.23		ACC12

Table 16. SHV2 connections.

SHV3 (controlled from S3)		**Detector**	**Cable labels**		
HV channel	PMTs	TOF panel	SHV side	Middle	PMT side
0	301n1 + 310n2	HV6	SHV-101	3n	SHV-101
1	301n2	HV2	SHV-102	3n	SHV-102
2	302n1 + 309n2	HV1	SHV-103	3n	SHV-103
3	302n2 + 309n1	HV4	SHV-104	3n	SHV-104
4	303n1 + 308n2	HV3	SHV-105	3n	SHV-105
5	303n2 + 308n1	HV5	SHV-106	3n	SHV-106
6	304n1 + 307n2	HV7	SHV-107	3n	SHV-107
7	304n2 + 307n1	HV8	SHV-108	3n	SHV-108
8	305n1 + 306n2	HV9	SHV-109	3n	SHV-109
9	305n2 + 306n1	HV10	SHV-110	3n	SHV-110
10	310n1	HV11	SHV-111	3n	SHV-111
11	401n1 + 408n3	HV3	SHV-501	4n	SHV-501
12	401n2 + 408n2	HV9	SHV-502	4n	SHV-502
13	401n3 + 408n1	HV2	SHV-503	4n	SHV-503
14	402n1 + 407n2	HV6	SHV-504	4n	SHV-504
15	402n2 + 407n1	HV7	SHV-505	4n	SHV-505
16	403n1 + 406n2	HV8	SHV-506	4n	SHV-506
17	403n2 + 406n1	HV4	SHV-507	4n	SHV-507
18	404n1 + 405n2	HV1	SHV-508	4n	SHV-508
19	404n2 + 405n1	HV5	SHV-509	4n	SHV-509
20	ACC13	—	SHV3.20		ACC13
21	ACC14	—	SHV3.21		ACC14
22	ACC15	—	SHV3.22		ACC15
23	ACC16	—	SHV3.23		ACC16

Table 17. SHV3 connections.

5. SLOW-CONTROL CHANNELS

5.1. Temperature sensors

For each TOF plane, two Dallas chains (A and B) are installed, with 8 sensors each.

Name	Sensor ID (hex)	Position
TOF-1-DS0A	30000800AAE91C10	SFEC_00
TOF-1-DS1A	A8000800AAD77010	106n1
TOF-1-DS2A	4F000800AADDE510	104n1
TOF-1-DS3A	0C000800AADF1310	102n1
TOF-1-DS4A	B9000800AAE4C410	108p2
TOF-1-DS5A	1D000800AAC74F10	106p2
TOF-1-DS6A	57000800AAC32610	104p2
TOF-1-DS7A	7A000800AB07E610	SFEC_10
TOF-1-DS0B	58000800AB04F710	SFEC_00
TOF-1-DS1B	0C000800AB024D10	106n1
TOF-1-DS2B	56000800AAC08810	104n1
TOF-1-DS3B	1A000800AB0E4C10	102n1
TOF-1-DS4B	7A000800AAA3FD10	108p2
TOF-1-DS5B	62000800AAF5E010	106p2
TOF-1-DS6B	EB000800AADB1810	104p2
TOF-1-DS7B	21000800AAB70010	SFEC_10
Name	**Sensor ID (hex)**	**Position**
TOF-2-DS0A	FE000800AAA14D10	208n2
TOF-2-DS1A	2E000800AAEFAB10	SFEC_11
TOF-2-DS2A	B2000800AAC07110	204n1
TOF-2-DS3A	A7000800AAE15810	201n1
TOF-2-DS4A	9E000800AAA76010	208p2
TOF-2-DS5A	DA000800AABF5510	204p1
TOF-2-DS6A	D3000800AA9BF310	SFEC_01
TOF-2-DS7A	97000800AA9CC810	201p1
TOF-2-DS0B	A3000800AAF59310	208n2
TOF-2-DS1B	5F000800AAE53710	SFEC_11
TOF-2-DS2B	2D000800AAFEAD10	204n1
TOF-2-DS3B	96000800AAF83410	201n1
TOF-2-DS4B	C5000800AB004010	208p2
TOF-2-DS5B	98000800AAFA7F10	204p1
TOF-2-DS6B	59000800AAA72610	SFEC_01
TOF-2-DS7B	88000800AAE85C10	201p1

Table 18. Dallas sensors in planes 1 and 2.

Name	Sensor ID (hex)	Position
TOF-3-DS0A	9A000800AAD94C10	SFEC_30
TOF-3-DS1A	97000800AA972B10	302n1
TOF-3-DS2A	99000800AAE08910	305n2
TOF-3-DS3A	D8000800AAC43110	309n2
TOF-3-DS4A	12000800AAB8A010	301p2
TOF-3-DS5A	73000800AAA8D710	305p2
TOF-3-DS6A	80000800AAF14810	309p2
TOF-3-DS7A	CB000800AAB78010	SFEC_20
TOF-3-DS0B	37000800AAFF7310	SFEC_30
TOF-3-DS1B	C7000800AB052E10	302n1
TOF-3-DS2B	3D000800AAF97A10	305n2
TOF-3-DS3B	D0000800AADC3C10	309n2
TOF-3-DS4B	A5000800AAA70B10	301p2
TOF-3-DS5B	7D000800AAB3C410	305p2
TOF-3-DS6B	EC000800AAAD6A10	309p2
TOF-3-DS7B	5F000800AAEAB010	SFEC_20
Name	**Sensor ID (hex)**	**Position**
TOF-4-DS0A	8B000800AADE1E10	SFEC_31
TOF-4-DS1A	8E000800AAF67E10	402n2
TOF-4-DS2A	DA000800AB013D10	404n2
TOF-4-DS3A	6A000800AAFD6410	406n2
TOF-4-DS4A	D8000800AAD68A10	401p1
TOF-4-DS5A	F2000800AAF86910	404p1
TOF-4-DS6A	52000800AAE97410	406p1
TOF-4-DS7A	E5000800AAC8C310	SFEC_21
TOF-4-DS0B	EC000800AAAF5810	SFEC_31
TOF-4-DS1B	8C000800AAC96810	402n2
TOF-4-DS2B	F0000800AAB0A410	404n2
TOF-4-DS3B	C9000800AAF3E110	406n2
TOF-4-DS4B	21000800AA953910	401p1
TOF-4-DS5B	20000800AAAEDD10	404p1
TOF-4-DS6B	12000800AABFEF10	406p1
TOF-4-DS7B	43000800AA944810	SFEC_21

Table 19. Dallas sensors in planes 3 and 4.

5.2. Heaters

TOF planes 3 and 4 have heaters installed in the PMT regions (connectors labelled “H3” and “H4” on LowerTOF panels see figure 12).

6. TOF panels

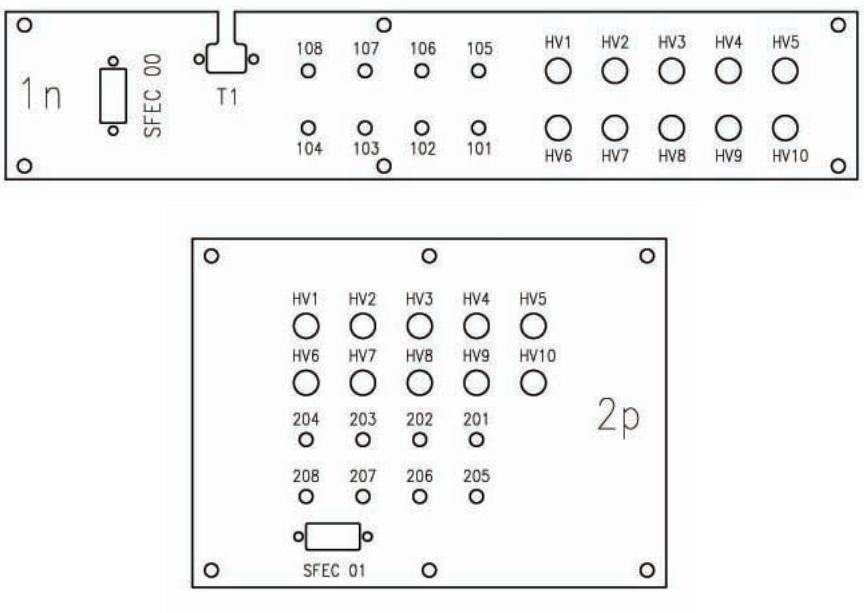


Figure 10. TOF panel of planes 1 side n and 2 side p.

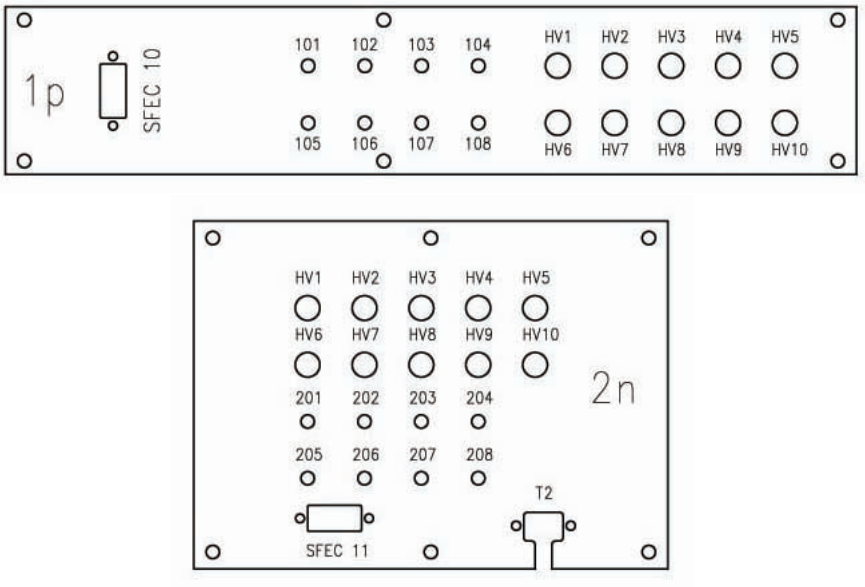


Figure 11. TOF panel of planes 1 side p and 2 side n.

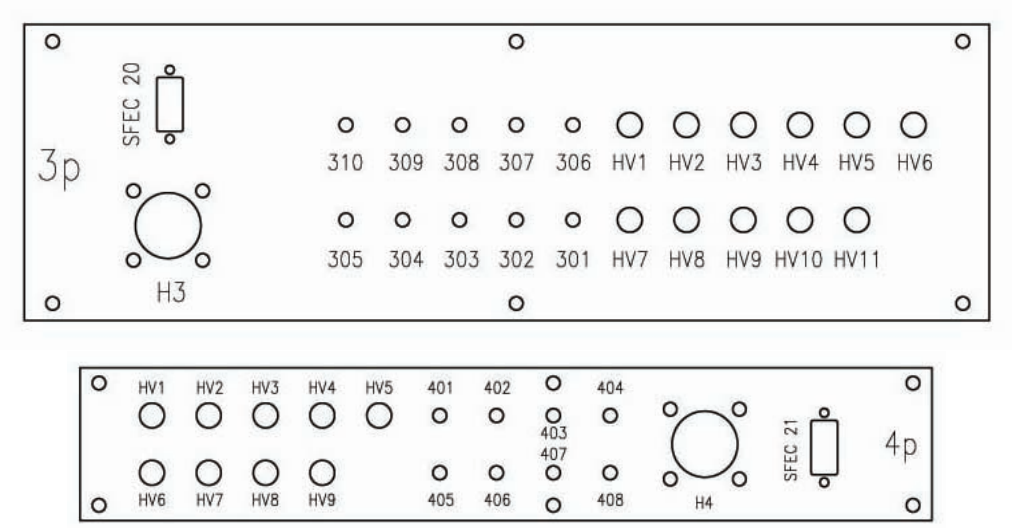


Figure 12. TOF panel of planes 3 and 4, side p.

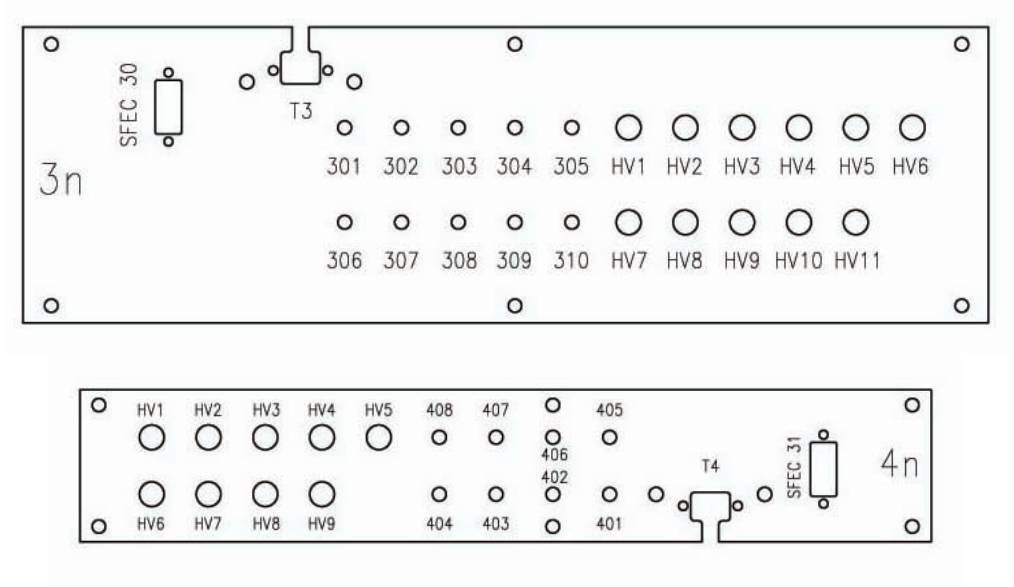


Figure 13. TOF panel of planes 3 and 4, side n.

7. Cables and connectors for ACC and TOF

HV	Producer	Series	Part no.
Coaxial HV cable 18 kV AWG 26	Reynolds	600	167-2896
HV cable plug	Reynolds	600	167-3770
HV cable receptacle	Reynolds	600	167-3771

Signal	Producer	Series	Part no.
Coaxial 50 Ω cable PTFE insulated	Suhner	—	RG 178 B/U
50 Ω cable plug	Radiall	SSMB	R 203 073
50 Ω panel receptacle (TOF side)	Radiall	SSMB	R 203 313
50 Ω panel receptacle (S-crate)	Radiall	SSMB	R 203 553

Table 20. HV and signals cables and connectors.

Cabling and connectors from S-Crate and HV-Brick to TSPD are on document [3].

7.1. Cable lengths

Cable	From	To	L (m)
HV	TOF 1n	SHV0	2.9
HV	TOF 2p	SHV0	1.9
HV	ACC 1–4	SHV0	1.2
Anode	TOF 1n	S0	2.35
Anode	TOF 2p	S0	1.15
Anode	ACC 1–4	S0	0.8
SFEC	TOF 1n	S0	2.1
SFEC	TOF 2p	S0	1.0

Cable	From	To	L (m)
HV	TOF 1p	SHV1	2.9
HV	TOF 2n	SHV1	1.8
HV	ACC 5–8	SHV1	1.1
Anode	TOF 1p	S1	2.35
Anode	TOF 2n	S1	1.15
Anode	ACC 5–8	S1	0.8
SFEC	TOF 1p	S1	2.1
SFEC	TOF 2n	S1	1.0

Cable	From	To	L (m)
HV	TOF 3p	SHV2	1.8
HV	TOF 4p	SHV2	2.8
HV	ACC 9–12	SHV2	1.5
Anode	TOF 3p	S2	1.05
Anode	TOF 4p	S2	2.05
Anode	ACC 9–12	S2	1.1
SFEC	TOF 3p	S2	1.9
SFEC	TOF 4p	S2	1.0

Cable	From	To	L (m)
HV	TOF 3n	SHV3	1.7
HV	TOF 4n	SHV3	2.5
HV	ACC 13–16	SHV3	1.4
Anode	TOF 3n	S3	1.05
Anode	TOF 4n	S3	2.0
Anode	ACC 13–16	S3	1.1
SFEC	TOF 3n	S3	1.9
SFEC	TOF 4n	S3	1.0

Table 21. HV and signals cables lenght.

REFERENCES

[1]A. Basili, “Data Format”, http://ams.cern.ch/AMS/Electronics/SubD/Scint/.

[2]D. Casadei et al., “S-crate physical connections”, AMS Internal Note ScintEle–01, http://ams.cern.ch/AMS/Electronics/SubD/Scint/.

[3]A. Sabellek, A. Basili,“TSPD S-Crate Cabling”, http://ams.cern.ch/AMS/Electronics/SubD/Scint/.