

CEM
Notes:

- 1) Each 24 channel ASD board sums two channels (input A=Left PMT and input B=Right PMT) which are labeled 1-24.
- 2) The CEM harnesses are designed to take all 10 PMT inputs from both the left and right side of a wedge. Each cable is labeled using the notation like 9R21E where 9 is the PMT #, R is the right side PMT, wedge 21 on the East.
- 3) TDC slot number is the location of the TDC within the crate. All TDCs are contiguous. All the CEM TDCs come first, then the PEM TDC's. The first TDC sits in slot 4.
- 4) There are 4 racks on each side (EW) of the CEM. We refer to these as the NWT-B as North side, west wedge, Top half, bottom crate in the rack.
- 5) ASD: Each crate has two ASD's (in slots 11 and 14 to stay away from ADMEMs).
- 6) ASD: The Left and Right PMT lines from each Wedge go into the A&B sides of each TB. The lines are not consecutive, see Right and Item 6 of TDC mapping

Harness #	ASD/TB		ASD/TB Slot	ASD/TB Start Channel	TDC Crate/Slot	TDC Connector	TDC Channel Start	TB Wedge mapping		
	Rack	Crate						TB Row #	PMT Left Line	PMT Right Line
00W	NWT	Bottom	11	1	4	0	0	0	0L	0R
01W	NWT	Bottom	11	13	4	0	12	1	2L	2R
02W	NWT	Bottom	14	1	4	1	24	2	4L	4R
03W	NWT	Top	11	1	4	2	48	3	6L	6R
04W	NWT	Top	11	13	4	2	60	4	1L	1R
05W	NWT	Top	14	1	4	3	72	5	3L	3R
06W	SWT	Top	11	1	5	0	0	6	5L	5R
07W	SWT	Top	11	13	5	0	12	7	8L	8R
08W	SWT	Top	14	1	5	1	24	8	7L	7R
09W	SWT	Bottom	11	1	5	2	48	9	9L	9R
10W	SWT	Bottom	11	13	5	2	60	10	X	X
11W	SWT	Bottom	14	1	5	3	72	11	X	X
12W	SWB	Top	11	1	6	0	0	12	0L	0R
13W	SWB	Top	11	13	6	0	12	13	2L	2R
14W	SWB	Top	14	1	6	1	24	14	4L	4R
15W	SWB	Bottom	11	1	6	2	48	15	6L	6R
16W	SWB	Bottom	11	13	6	2	60	16	1L	1R
17W	SWB	Bottom	14	1	6	3	72	17	3L	3R
18W	NWB	Bottom	11	1	7	0	0	18	5L	5R
19W	NWB	Bottom	11	13	7	0	12	19	8L	8R
20W	NWB	Bottom	14	1	7	1	24	20	7L	7R
21W	NWB	Top	11	1	7	2	48	21	9L	9R
22W	NWB	Top	11	13	7	2	60	22	X	X
23W	NWB	Top	14	1	7	3	72	23	X	X
00E	NET	Bottom	11	1	8	0	0			
01E	NET	Bottom	11	13	8	0	12			
02E	NET	Bottom	14	1	8	1	24			
03E	NET	Top	11	1	8	2	48			
04E	NET	Top	11	13	8	2	60			
05E	NET	Top	14	1	8	3	72			
06E	SET	Top	11	1	9	0	0			
07E	SET	Top	11	13	9	0	12			
08E	SET	Top	14	1	9	1	24			
09E	SET	Bottom	11	1	9	2	48			
10E	SET	Bottom	11	13	9	2	60			
11E	SET	Bottom	14	1	9	3	72			
12E	SEB	Top	11	1	10	0	0			
13E	SEB	Top	11	13	10	0	12			
14E	SEB	Top	14	1	10	1	24			
15E	SEB	Bottom	11	1	10	2	48			
16E	SEB	Bottom	11	13	10	2	60			
17E	SEB	Bottom	14	1	10	3	72			
18E	NEB	Bottom	11	1	11	0	0			
19E	NEB	Bottom	11	13	11	0	12			
20E	NEB	Bottom	14	1	11	1	24			
21E	NEB	Top	11	1	11	2	48			
22E	NEB	Top	11	13	11	2	60			
23E	NEB	Top	14	1	11	3	72			

PEM

- 1) Harness Notation: There are 12 PMT boxes on each side of the PEM. Each box covers two wedges, and each wedge is covered by one harness connected at the box using two connectors. The harness connectors correspond to PMT's 0-9 and 10-22 (only 10-15 are used on the second connector). On the PMT box the cables are into a single connector labeled EMTDC-6L which is wedge 6 on the Left. At the ASD/TB we combine the odd and even towers such that they are the same as the trigger towers (i.e., 0-1, 2-3, etc.) such that the evens go into the A slot on the ASD and the odds go into the B slot. The combined towers are not input consecutively (see Note 6 in TDC mapping)
- 2) PMT Boxes: Boxes 11,12, 1, 2, 3 and 4 are on the North, boxes 5-10 are on the south. Box 1 contains wedges 0 and 23.
- 3) PEM Readout racks: All ASD boards go in the middle rack of either the North or South rack. NWM = North West Middle
- 4) ASD Slot: There are 4 slots in the middle rack. We have chosen to start the ASD numbering with box 11 (Wedge 19) and have that go into the first slot in the crate (which is 4) then have the next wedges (in increasing PMT box number) go into the next slot in the crate until all four are used up. This continues onto the south side as well. We do this as this is the same as ADMEM definition. (according to PJW)
- 5) TDC's: For the TDC's to ASD cabling, we label them starting from Wedge 19 West (for the reasons mentioned above) and start after all the CEM TDC's which is slot 12.

Harness #	PMT Box	ASD/TB Rack/Crate	ASD/TB Slot	ASD/TB Channel	TDC Crate/Slot	TDC Connector	TDC Channel	TB Bulkhead mini-board mapping		
								TB Row #	PMT Left Line	PMT Right Line
00W	1	NWM	5	17-24, A&B sides	13	1	40->47	0	1	0
01W	2	NWM	6	01-08, A&B sides	13	2	48->55	1	5	4
02W	2	NWM	6	09-16, A&B sides	13	2	56->63	2	9	8
03W	3	NWM	6	17-24, A&B sides	13	2	64->71	3	13	12
04W	3	NWM	7	01-08, A&B sides	13	3	72->79	4	3	2
05W	4	NWM	7	09-16, A&B sides	13	3	80->87	5	7	6
06W	4	NWM	7	17-24, A&B sides	13	3	88->95	6	11	10
07W	5	SWM	4	01-08, A&B sides	12	0	00->07	7	15	14
08W	5	SWM	4	09-16, A&B sides	12	0	08->15			
09W	6	SWM	4	17-24, A&B sides	12	0	16->23			
10W	6	SWM	5	01-08, A&B sides	12	1	24->31			
11W	7	SWM	5	09-16, A&B sides	12	1	32->39			
12W	7	SWM	5	17-24, A&B sides	12	1	40->47			
13W	8	SWM	6	01-08, A&B sides	12	2	48->55			
14W	8	SWM	6	09-16, A&B sides	12	2	56->63			
15W	9	SWM	6	17-24, A&B sides	12	2	64->71			
16W	9	SWM	7	01-08, A&B sides	12	3	72->79			
17W	10	SWM	7	09-16, A&B sides	12	3	80->87			
18W	10	SWM	7	17-24, A&B sides	12	3	88->95			
19W	11	NWM	4	01-08, A&B sides	13	0	00->07			
20W	11	NWM	4	09-16, A&B sides	13	0	08->15			
21W	12	NWM	4	17-24, A&B sides	13	0	16->23			
22W	12	NWM	5	01-08, A&B sides	13	1	24->31			
23W	1	NWM	5	09-16, A&B sides	13	1	32->39			
00E	1	NEM	5	17-24, A&B sides	15	1	40->47			
01E	2	NEM	6	01-08, A&B sides	15	2	48->55			
02E	2	NEM	6	09-16, A&B sides	15	2	56->63			
03E	3	NEM	6	17-24, A&B sides	15	2	64->71			
04E	3	NEM	7	01-08, A&B sides	15	3	72->79			
05E	4	NEM	7	09-16, A&B sides	15	3	80->87			
06E	4	NEM	7	17-24, A&B sides	15	3	88->95			
07E	5	SEM	4	01-08, A&B sides	14	0	00->07			
08E	5	SEM	4	09-16, A&B sides	14	0	08->15			
09E	6	SEM	4	17-24, A&B sides	14	0	16->23			
10E	6	SEM	5	01-08, A&B sides	14	1	24->31			
11E	7	SEM	5	09-16, A&B sides	14	1	32->39			
12E	7	SEM	5	17-24, A&B sides	14	1	40->47			
13E	8	SEM	6	01-08, A&B sides	14	2	48->55			
14E	8	SEM	6	09-16, A&B sides	14	2	56->63			
15E	9	SEM	6	17-24, A&B sides	14	2	64->71			
16E	9	SEM	7	01-08, A&B sides	14	3	72->79			
17E	10	SEM	7	09-16, A&B sides	14	3	80->87			
18E	10	SEM	7	17-24, A&B sides	14	3	88->95			
19E	11	NEM	4	01-08, A&B sides	15	0	00->07			
20E	11	NEM	4	09-16, A&B sides	15	0	08->15			
21E	12	NEM	4	17-24, A&B sides	15	0	16->23			
22E	12	NEM	5	01-08, A&B sides	15	1	24->31			
23E	1	NEM	5	09-16, A&B sides	15	1	32->39			

1) TDC Info: Using the mappings above we can uniquely specify each module ID and channel ID. See CDFNote 4152

2) Module ID, Bits 4:0=Lowest Wedge in TDC, Bit 5: 0=West, 1=East, Bit 6: Rapidity Low or high (0=lowers 0=Regular, 1=Test configuration), Bit 7=system (0=Regular running, 1=Test configuration), Bit 8=Unused

3) Channel ID, Bits 3:0=Rapidity segmentation modulo 10 (0:9 for CEM and 0:7 for PEM, in CEM there are no channels 10&11, but we label the spares this way to make every channel unique, to get the rapidity segment add 10 for the PEM), Bits 8:4=Wedge within TDC (0:7 for CEM, 0:11 for PEM. To get the wedge number add to the lowest wedge as specified in the Module ID modulo 24.)

5) The boxes highlighted in yellow correspond to wedges which are unphysical for the CEM and are spares. We have simply labeled them (albeit not uniquely) for identification purposes. The skipped channel list for the CEM always contains channels: 10, 11, 22, 23, 34-47, 58, 59, 70, 71, 82-95.

6) The CEM and PEM lines into the transition boards are not done consecutively so that the clusters (electrons, jets, photons etc.) do not fire consecutive ASD/TDC channels.

		West CEM 0-5	West CEM 6-11	West CEM 12-17	West CEM 18-23	East CEM 0-5	East CEM 6-11	East CEM 12-17	East CEM 18-23	West PEM 7-18	West PEM 19-23, 0-6	East PEM 7-18	East PEM 19-23, 0-6
	TDC Slot #	4	5	6	7	8	9	10	11	12	13	14	15
	Module ID	0	6	12	18	32	38	44	50	71	83	103	115
Connector													
0	ChanID00	0	0	0	0	0	0	0	0	0	0	0	0
0	ChanID01	2	2	2	2	2	2	2	2	2	2	2	2
0	ChanID02	4	4	4	4	4	4	4	4	4	4	4	4
0	ChanID03	6	6	6	6	6	6	6	6	6	6	6	6
0	ChanID04	1	1	1	1	1	1	1	1	1	1	1	1
0	ChanID05	3	3	3	3	3	3	3	3	3	3	3	3
0	ChanID06	5	5	5	5	5	5	5	5	5	5	5	5
0	ChanID07	8	8	8	8	8	8	8	8	8	8	8	8
0	ChanID08	7	7	7	7	7	7	7	7	16	16	16	16
0	ChanID09	9	9	9	9	9	9	9	9	18	18	18	18
0	ChanID10	10	10	10	10	10	10	10	10	20	20	20	20
0	ChanID11	11	11	11	11	11	11	11	11	22	22	22	22
0	ChanID12	16	16	16	16	16	16	16	16	17	17	17	17
0	ChanID13	18	18	18	18	18	18	18	18	19	19	19	19
0	ChanID14	20	20	20	20	20	20	20	20	21	21	21	21
0	ChanID15	22	22	22	22	22	22	22	22	23	23	23	23
0	ChanID16	17	17	17	17	17	17	17	17	32	32	32	32
0	ChanID17	19	19	19	19	19	19	19	19	34	34	34	34
0	ChanID18	21	21	21	21	21	21	21	21	36	36	36	36
0	ChanID19	24	24	24	24	24	24	24	24	38	38	38	38
0	ChanID20	23	23	23	23	23	23	23	23	33	33	33	33
0	ChanID21	25	25	25	25	25	25	25	25	35	35	35	35
0	ChanID22	26	26	26	26	26	26	26	26	37	37	37	37
0	ChanID23	27	27	27	27	27	27	27	27	39	39	39	39
1	ChanID24	32	32	32	32	32	32	32	32	48	48	48	48
1	ChanID25	34	34	34	34	34	34	34	34	50	50	50	50
1	ChanID26	36	36	36	36	36	36	36	36	52	52	52	52
1	ChanID27	38	38	38	38	38	38	38	38	54	54	54	54
1	ChanID28	33	33	33	33	33	33	33	33	49	49	49	49
1	ChanID29	35	35	35	35	35	35	35	35	51	51	51	51
1	ChanID30	37	37	37	37	37	37	37	37	53	53	53	53
1	ChanID31	40	40	40	40	40	40	40	40	55	55	55	55
1	ChanID32	39	39	39	39	39	39	39	39	64	64	64	64
1	ChanID33	41	41	41	41	41	41	41	41	66	66	66	66
1	ChanID34	42	42	42	42	42	42	42	42	68	68	68	68
1	ChanID35	43	43	43	43	43	43	43	43	70	70	70	70
1	ChanID36	42	42	42	42	42	42	42	42	65	65	65	65
1	ChanID37	42	42	42	42	42	42	42	42	67	67	67	67
1	ChanID38	42	42	42	42	42	42	42	42	69	69	69	69
1	ChanID39	42	42	42	42	42	42	42	42	71	71	71	71
1	ChanID40	42	42	42	42	42	42	42	42	80	80	80	80
1	ChanID41	42	42	42	42	42	42	42	42	82	82	82	82
1	ChanID42	42	42	42	42	42	42	42	42	84	84	84	84
1	ChanID43	42	42	42	42	42	42	42	42	86	86	86	86
1	ChanID44	42	42	42	42	42	42	42	42	81	81	81	81
1	ChanID45	42	42	42	42	42	42	42	42	83	83	83	83
1	ChanID46	42	42	42	42	42	42	42	42	85	85	85	85
1	ChanID47	42	42	42	42	42	42	42	42	87	87	87	87
2	ChanID48	48	48	48	48	48	48	48	48	96	96	96	96
2	ChanID49	50	50	50	50	50	50	50	50	98	98	98	98
2	ChanID50	52	52	52	52	52	52	52	52	100	100	100	100
2	ChanID51	54	54	54	54	54	54	54	54	102	102	102	102
2	ChanID52	49	49	49	49	49	49	49	49	97	97	97	97
2	ChanID53	51	51	51	51	51	51	51	51	99	99	99	99
2	ChanID54	53	53	53	53	53	53	53	53	101	101	101	101
2	ChanID55	56	56	56	56	56	56	56	56	103	103	103	103
2	ChanID56	55	55	55	55	55	55	55	55	112	112	112	112
2	ChanID57	57	57	57	57	57	57	57	57	114	114	114	114
2	ChanID58	58	58	58	58	58	58	58	58	116	116	116	116
2	ChanID59	59	59	59	59	59	59	59	59	118	118	118	118
2	ChanID60	64	64	64	64	64	64	64	64	113	113	113	113
2	ChanID61	66	66	66	66	66	66	66	66	115	115	115	115
2	ChanID62	68	68	68	68	68	68	68	68	117	117	117	117
2	ChanID63	70	70	70	70	70	70	70	70	119	119	119	119
2	ChanID64	65	65	65	65	65	65	65	65	128	128	128	128
2	ChanID65	67	67	67	67	67	67	67	67	130	130	130	130
2	ChanID66	69	69	69	69	69	69	69	69	132	132	132	132
2	ChanID67	72	72	72	72	72	72	72	72	134	134	134	134
2	ChanID68	71	71	71	71	71	71	71	71	129	129	129	129
2	ChanID69	73	73	73	73	73	73	73	73	131	131	131	131
2	ChanID70	74	74	74	74	74	74	74	74	133	133	133	133
2	ChanID71	75	75	75	75	75	75	75	75	135	135	135	135
3	ChanID72	80	80	80	80	80	80	80	80	144	144	144	144
3	ChanID73	82	82	82	82	82	82	82	82	146	146	146	146
3	ChanID74	84	84	84	84	84	84	84	84	148	148	148	148
3	ChanID75	86	86	86	86	86	86	86	86	150	150	150	150
3	ChanID76	81	81	81	81	81	81	81	81	145	145	145	145
3	ChanID77	83	83	83	83	83	83	83	83	147	147	147	147
3	ChanID78	85	85	85	85	85	85	85	85	149	149	149	149
3	ChanID79	88	88	88	88	88	88	88	88	151	151	151	151
3	ChanID80	87	87	87	87	87	87	87	87	160	160	160	160
3	ChanID81	89	89	89	89	89	89	89	89	162	162	162	162
3	ChanID82	90	90	90	90	90	90	90	90	164	164	164	164
3	ChanID83	91	91	91	91	91	91	91	91	166	166	166	166
3	ChanID84	90	90	90	90	90	90	90	90	161	161	161	161
3	ChanID85	90	90	90	90	90	90	90	90	163	163	163	163
3	ChanID86	90	90	90	90	90	90	90	90	165	165	165	165
3	ChanID87	90	90	90	90	90	90	90	90	167	167	167	167
3	ChanID88	90	90	90	90	90	90	90	90	176	176	176	176
3	ChanID89	90	90	90	90	90	90	90	90	178	178	178	178
3	ChanID90	90	90	90	90	90	90	90	90	180	180	180	180
3	ChanID91	90	90	90	90	90	90	90	90	182	182	182	182
3	ChanID92	90	90	90	90	90	90	90	90	177	177	177	177
3	ChanID93	90	90	90	90	90							