Tagger Microscope Electronics and Cabling Map

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Fiber Geometry

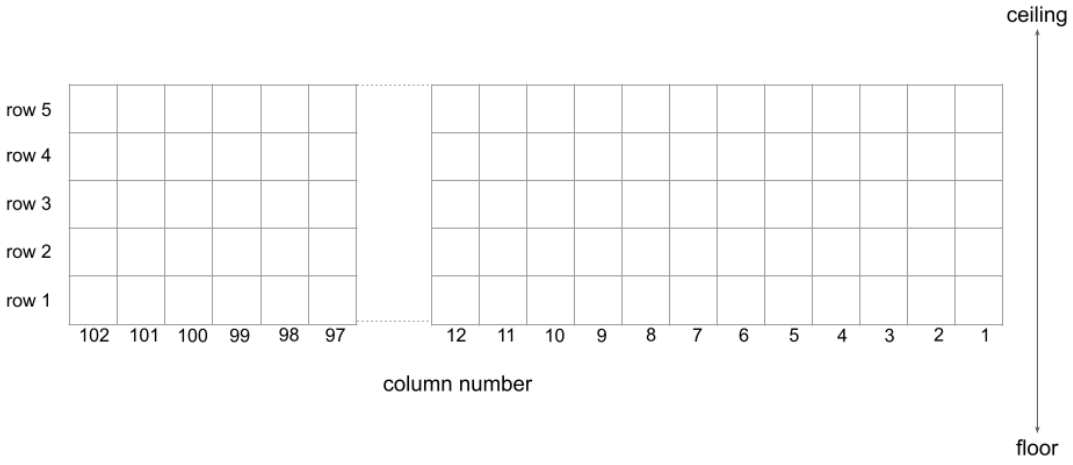

Figure 1. Geometry of the tagger microscope fiber array, indexed by column and row number. The most energetic electrons are at the left in this figure.

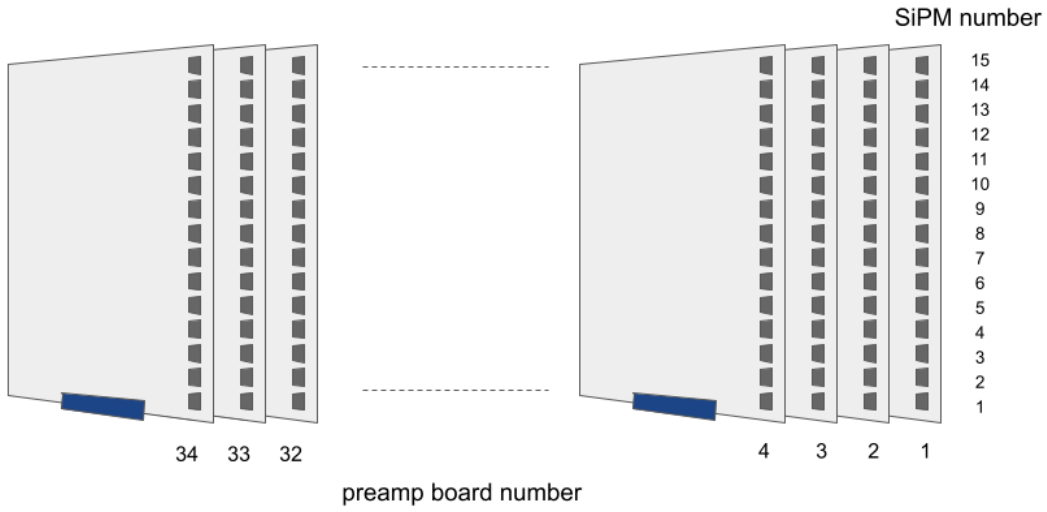

Figure 2. Layout of the tagger microscope preamplifier boards installed in the readout enclosure, as viewed from above.

Fig.1 shows the active surface of the microscope fiber array, as viewed by an incoming electron as it exits the tagger magnet vacuum. The fibers are labeled by row and column, with the row numbers from 1 (bottom row) to 5 (top row), and columns from 1 (right) to 102 (left).

Fig. 2 shows the preamplifier stack as it is installed in the readout box just beneath the active region depicted in Fig. 1. Individual silicon photomultipliers (SiPMs) are represented by the dark squares, arranged in a linear array of 15 per preamp board. The preamp signals are indexed by board number 1...34 and SiPM number 1...15 as shown in the figure. The mapping from fiber address to preamp address is illustrated in Fig. 3.

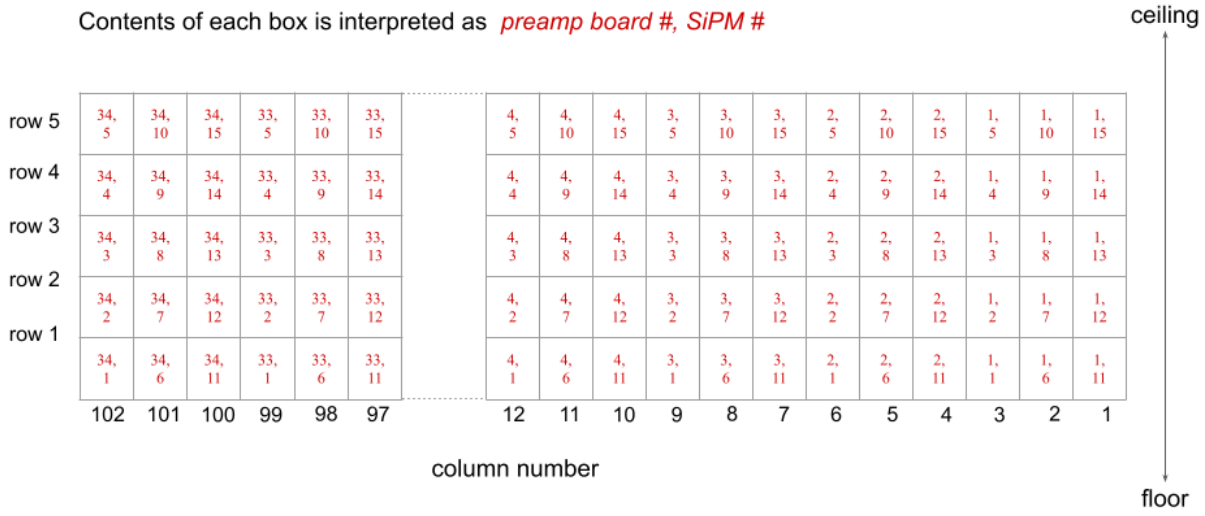

Figure 3. Mapping of fiber connections from physical address on the scintillator array to preamp electronic address.

Backplane Connections

Fig. 4 shows an image of one of the electronics backplanes that provides the interconnect between the preamp boards on one side (background in Fig. 4) and the control cards and readout + power cable connectors on the other (foreground in Fig. 4). All of the sum outputs are connected to readout cables, whereas only one out of every 6 columns has its 5 individual fiber signals available on a LEMO connector. At present, only 4 sets of 5 individual fiber signals are being read out, corresponding to fiber columns 9, 27, 81, and 99.

The mapping from preamp, SiPM number to LEMO output connector is given in Table 1. There are 3 cables that were swapped around during running in 2016, and the logbook does not record whether or not they were ever swapped back to the original cable assignments. This should be checked visually, if possible. If the cables have been removed, they can be put back using the cable numbers in Table 1, but then the other ends of the cables back at the data acquisition rack should also be put back to the regular order of sequential channels in the readout modules.

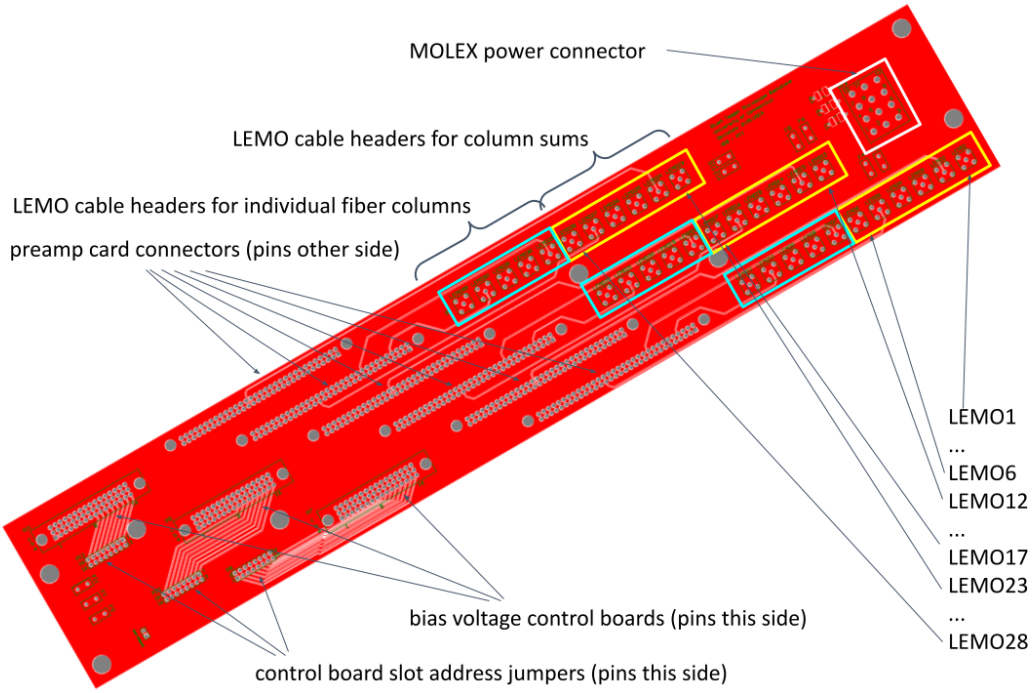

Figure 4. Layout of the microscope backplane, viewed from the side where the readout cables connect and the Vbias control boards are located. Microscope fiber column summed readout LEMO connectors are highlighted in the yellow boxes, while the individual fiber readout LEMO connectors for selected columns are highlighted by the blue boxes.

Table 1. Mapping from preamp / SiPM number to LEMO output connector on the backplane, for backplanes number from right to left. The cable numbers of the coaxial signal cables that carry the amplified signals from the microscope to the data acquisition crate are also listed. Signals that represent the sum of rows 1-5 are indicated by row 0.

backplane	cable#	LEMO#	preamp#	SiPM#	column	row
1	1	6	1	1-5	3	0
	2	5	1	1-5	2	0
	3	4	1	1-5	1	0
	4	3	2	1-5	6	0
	5	2	2	1-5	5	0
	6	1	2	1-5	4	0
	7	22	3	1	9	1
	8	21	3	2	9	2
	9	20	3	3	9	3
	10	19	3	4	9	4
	11	18	3	5	9	5
	12	17	3	1-5	9	0
	13	16	3	1-5	8	0
	14	15	3	1-5	7	0
	15	14	4	1-5	12	0
	16	13	4	1-5	11	0
	17	12	4	1-5	10	0
	18	28	5	1-5	15	0
	19	27	5	1-5	14	0
	20	26	5	1-5	13	0
	21	25	6	1-5	18	0
	22	24	6	1-5	17	0
	23	23	6	1-5	16	0
2	**24**	6	7	1-5	21	0
	25	5	7	1-5	20	0
	26	4	7	1-5	19	0
	27	3	8	1-5	24	0
	28	2	8	1-5	23	0
	29	1	8	1-5	22	0
	30	22	9	1	27	1
	31	21	9	2	27	2
	32	20	9	3	27	3
	33	19	9	4	27	4
	34	18	9	5	27	5
	35	17	9	1-5	27	0
	36	16	9	1-5	26	0
	37	15	9	1-5	25	0
	38	14	10	1-5	30	0

	39	13	10	1-5	29	0
	40	12	10	1-5	28	0
	41	28	11	1-5	33	0
	42	27	11	1-5	32	0
	43	26	11	1-5	31	0
	44	25	12	1-5	36	0
	45	24	12	1-5	35	0
	46	23	12	1-5	34	0
3	47	6	13	1-5	39	0
	48	5	13	1-5	38	0
	49	4	13	1-5	37	0
	50	3	14	1-5	42	0
	51	2	14	1-5	41	0
	52	1	14	1-5	40	0
	53	17	15	1-5	45	0
	54	16	15	1-5	44	0
	55	15	15	1-5	43	0
	56	14	16	1-5	48	0
	57	13	16	1-5	47	0
	58	12	16	1-5	46	0
	59	28	17	1-5	51	0
	60	27	17	1-5	50	0
	61	26	17	1-5	49	0
	62	25	18	1-5	54	0
	63	24	18	1-5	53	0
	64	23	18	1-5	52	0
4	65	6	19	1-5	57	0
	66	5	19	1-5	56	0
	67	4	19	1-5	55	0
	68	3	20	1-5	60	0
	69	2	20	1-5	59	0
	70	1	20	1-5	58	0
	71	17	21	1-5	63	0
	72	16	21	1-5	62	0
	73	15	21	1-5	61	0
	74	14	22	1-5	66	0
	75	13	22	1-5	65	0
	76	12	22	1-5	64	0
	77	28	23	1-5	69	0
	78	27	23	1-5	68	0
	79	26	23	1-5	67	0
	80	25	24	1-5	72	0
	81	24	24	1-5	71	0
	82	23	24	1-5	70	0

5	83	6	25	1-5	75	0
	84	5	25	1-5	74	0
	85	4	25	1-5	73	0
	86	3	26	1-5	78	0
	87	2	26	1-5	77	0
	88	1	26	1-5	76	0
	89	22	27	1	81	1
	90	21	27	2	81	2
	91	20	27	3	81	3
	92	19	27	4	81	4
	93	18	27	5	81	5
	94	17	27	1-5	81	0
	95	16	27	1-5	80	0
	96	15	27	1-5	79	0
	97	14	28	1-5	84	0
	98	13	28	1-5	83	0
	99	12	28	1-5	82	0
	100	28	29	1-5	87	0
	101	27	29	1-5	86	0
	102	26	29	1-5	85	0
	103	25	30	1-5	90	0
	104	24	30	1-5	89	0
	105	23	30	1-5	88	0
6	106	6	31	1-5	93	0
	107	5	31	1-5	92	0
	108	4	31	1-5	91	0
	109	3	32	1-5	96	0
	110	2	32	1-5	95	0
	111	1	32	1-5	94	0
	112	22	33	1	99	1
	113	21	33	2	99	2
	114	20	33	3	99	3
	115	19	33	4	99	4
	116	18	33	5	99	5
	117	17	33	1-5	99	0
	118	16	33	1-5	98	0
	119	15	33	1-5	97	0
	120	14	34	1-5	102	0
	121	13	34	1-5	101	0
	122	12	34	1-5	100	0