



Jefferson Lab Alignment Group

Data Transmittal

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DATE: 23 Mar 2016

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Checked:

: B1708

DETAILS:

M:\align\DATA\Inspection\HallB\Torus12G\mapper\160323A

Below are the results of the CF mapper survey carried out on March 22nd, 2016. The purpose of the survey was to determine how well the mapper probe holder tracked within the carbon fiber tracking tube. The coordinates are based on a best fit line of 32 fit points. All data are millimeters.

The first set of data show how well the mapper repeated from the upstream limit switch to the downstream position (position 32). The columns are explained:

- Set is the run of data with an observation at the limit point and position 32.
- x,y,z are the observed coordinates [millimeters].
- total dz is the Z length from the limit to position 32 for each set of data.
- Delta limit is the difference in Z between the current set and the next set.
- Delta P32 is the difference in Z between current set and next at position 32.
- x/y mag is the root mean square of the x/y coordinates from the calculated best fit line.
- x/y delta limit is the difference between x/y magnitude between subsequent limit switch and
- x/y delta p32 is the x/y magnitude deltas between subsequent position 32 observations

Note that at the limit switch and extreme points, the x/y deviations were the largest (see next set of data).

Limit switch to position 32 tests [mm]										
Set	Point Name	X	Y	Z	total dz	delta limit	delta p32	x/y mag	x/y delta limit	x/y delta p32
0	Limit	0.167	-0.028	-824.058	1599.056	-0.064		0.169	-0.008	
	Pos32	-0.018	-0.072	774.998			0.006	0.074		-0.012
1	Limit	0.174	-0.034	-824.122	1599.114	-0.058		0.177	0.022	
	Pos32	-0.025	-0.082	774.992			-0.070	0.086		-0.002
2	Limit	0.153	-0.029	-824.056	1599.118	-0.007		0.156	-0.014	
	Pos32	-0.027	-0.083	775.062			0.007	0.087		-0.004
3	Limit	0.164	-0.043	-824.063	1599.118	-0.017		0.170	0.004	
	Pos32	-0.024	-0.088	775.055			0.028	0.091		0.001
4	Limit	0.160	-0.043	-824.080	1599.107	-0.021		0.166	-0.019	
	Pos32	-0.024	-0.087	775.027			0.000	0.090		0.002
5	Limit	0.178	-0.050	-824.101	1599.128	0.011		0.185	0.014	
	Pos32	-0.019	-0.086	775.027			-0.020	0.088		-0.001
6	Limit	0.164	-0.047	-824.090	1599.137			0.171	0.002*	
	Pos32	-0.021	-0.087	775.047				0.089		0.015**

*indicates difference between set 6 and set 0 at the limit switch. ** indicates difference between set 6 and 0 at position 32.

The next chart shows the first run and the deviations from the calculated line in x/y magnitude at each position (1 to 32).



The grid below shows the coordinates for the above chart. Also shown is the x/y magnitude difference for each point and delta z, which is the z difference between subsequent measurements.

Point Name	X (mm)	Y (mm)	Z (mm)	x/y mag	delta z	back run Z	delta fwd run / back run
Limit	0.177	-0.040	-824.081	0.181		-824.039	0.042
Pos1	0.089	-0.034	-775.071	0.095	49.010	-774.016	1.055
Pos2	0.052	0.000	-725.213	0.052	49.858	-723.943	1.270
Pos3	-0.007	0.024	-675.138	0.025	50.075	-673.945	1.193
Pos4	0.013	0.028	-625.063	0.031	50.075	-623.992	1.071
Pos5	-0.002	0.004	-575.057	0.004	50.006	-573.98	1.077
Pos6	0.002	-0.013	-525.040	0.013	50.017	-523.986	1.054
Pos7	-0.026	-0.040	-475.037	0.048	50.003	-473.986	1.051
Pos8	-0.040	0.003	-425.019	0.040	50.018	-423.993	1.026
Pos9	-0.074	0.040	-375.013	0.084	50.006	-373.991	1.022
Pos10	-0.079	0.047	-325.022	0.092	49.991	-323.968	1.054
Pos11	0.027	0.011	-275.013	0.029	50.009	-273.979	1.034
Pos12	0.090	0.001	-224.999	0.090	50.014	-223.979	1.020
Pos13	0.061	0.006	-174.993	0.061	50.006	-173.973	1.020
Pos14	-0.044	-0.038	-124.994	0.058	49.999	-123.957	1.037
Pos15	-0.042	-0.075	-74.981	0.086	50.013	-73.951	1.030
Pos16	-0.010	-0.052	-24.963	0.053	50.018	-23.948	1.015
Pos17	-0.028	-0.016	25.015	0.032	49.978	26.078	1.063

Pos18	0.001	-0.004	75.053	0.004	50.038	76.066	1.013
Pos19	-0.007	0.005	125.066	0.009	50.013	126.075	1.009
Pos20	-0.014	0.032	175.055	0.035	49.989	176.072	1.017
Pos21	-0.083	0.053	225.057	0.098	50.002	226.047	0.990
Pos22	-0.063	0.095	275.053	0.114	49.996	276.047	0.994
Pos23	-0.058	0.071	325.035	0.092	49.982	326.076	1.041
Pos24	-0.008	0.020	375.035	0.022	50.000	376.086	1.051
Pos25	0.025	-0.041	425.091	0.048	50.056		
Pos26	0.059	-0.014	475.077	0.061	49.986	476.06	0.983
Pos27	0.031	0.010	525.079	0.033	50.002	526.047	0.968
Pos28	0.009	0.010	575.068	0.013	49.989	576.042	0.974
Pos29	0.010	0.003	625.063	0.010	49.995	626.054	0.991
Pos30	0.030	0.007	675.065	0.031	50.002	676.053	0.988
Pos31	0.021	-0.047	725.065	0.051	50.000		0.979
Pos32	-0.020	-0.089	775.071	0.091	50.006		

Run comparing run 3 and a check run

Position	z delta	magnitude delta
Pos1	0.097	-0.004
Pos2	0.131	-0.004
Pos3	0.108	0.011
Pos4	0.109	0.018
Pos5	0.116	-0.003
Pos6	0.129	-0.020
Pos7	0.117	-0.006
Pos8	0.107	-0.007
Pos9	0.111	0.008
Pos10	0.111	-0.004
Pos11	0.115	0.004
Pos12	0.102	0.006
Pos13	0.101	0.008
Pos14	0.100	0.004
Pos15	0.092	-0.007
Pos16	0.083	-0.011
Pos17	0.078	-0.002
Pos18	0.095	0.001
Pos19	0.085	0.002
Pos20	0.085	0.011
Pos21	0.085	0.000
Pos22	0.086	0.001
Pos23	0.084	-0.009
Pos24	0.063	0.007
Pos25	0.076	0.004
Pos26	0.079	-0.002

Pos27	0.072	-0.003
Pos28	0.076	0.015
Pos29	0.067	0.014
Pos30	0.061	0.012
Pos31	0.056	0.003