Jefferson Lab Alignment Group
Data Transmittal

TO: D. Mack, D. Gaskell, S. Wood		**DATE:** 28 Oct 2011	
FROM: Kelly Tremblay		**Checked:** (cg)	**# :** C1414

DETAILS: data: step2b\hallc\qweak\111026a

The Quartz Bar Detectors in Hall C were surveyed on October 26th, 2011. The table shown on the following page contains the as-found coordinates in both the Qtor magnet system and the local Quartz Bar system as defined in Dave Mack's alignment system (see sketch). Additionally the movements in the local system are shown.

The first group of coordinates are the as-found locations of the bars in the Qtor coordinate system, with the origin at the center of the Qtor magnet. The axis are: Z+ following the beam, X+ transverse in the horizontal direction and Y+ vertically up. Units are meters.

The second group of coordinates describes the as-found locations in the local system for each individual detector. Z+ is in the beam direction with origin at the downstream edge of the bar (570.625 cm downstream of Qtor center, 341 cm radially from beam centerline), X is radially outward from the beamline, and Y follows the downstream top edge of the bar at the appropriate angle.

The column labeled "Ri Component", is the amount that the bars need to be radial displaced in the local quartz X direction. The Ri amount is based upon the amount of Z movement from the ideal Z location and based upon the formula $Ri = \tan(22.24°)*(Zi - 570.625cm) + 341cm$. The formula corrects the radial (local X coordinate) position of the bars to catch the beam envelope, as described by D. Mack. Units are centimeters.

The final group of coordinates labeled "Movements", are the calculated amounts the detectors need to move in the local system. The X radial column is the amount the detectors would have to move out after applying the correction amount in the Ri column. A + value indicates the detector needs to move away from the beam centerline. The Y column indicates how much the detector needs to move along the local Y axis. A +Y value would mean the detector moves in positively along the Y axis. A + Z value indicates the detector needs to move downstream from the ideal local value (570.625cm from Qtor center). Units are centimeters.

Detector Side	Qtor Coord System			phi angle (deg)	Local Quartz Bar Coords			Ri component	Movements (cm)		
	Z (M)	X (M)	Y (M)		Local X (cm)	Local Y (cm)	Local Z (cm)		X Radial (cm)	Y(cm)	Z(cm)
MD1+	5.7753	3.4381	1.2533	0.00	343.69	125.65	577.91	343.82	0.02	0.40	6.90
MD1-	5.7724	3.4364	-1.2613		343.28	-125.81	576.92	343.70	0.06	0.40	6.61
MD2+	5.7791	1.5418	3.3187	45	343.69	125.65	577.91	343.98	0.29	0.08	7.28
MD2-	5.7692	3.3170	1.5377		343.28	-125.81	576.92	343.57	0.29	0.08	6.29
MD3+	5.7732	-1.2575	3.4330	90	343.30	125.75	577.32	343.74	0.44	-0.02	6.70
MD3-	5.7802	1.2571	3.4364		343.64	-125.71	578.02	344.02	0.38	-0.02	7.40
MD4+	5.7832	-3.3265	1.5376	135	343.94	126.50	578.32	344.15	0.21	-0.77	7.70
MD4-	5.7770	-1.5451	3.3124		343.48	-124.96	577.70	343.89	0.42	-0.77	7.08
MD5+	5.7818	-3.4395	-1.2609	180	343.95	126.09	578.18	344.09	0.14	-0.36	7.55
MD5-	5.7830	-3.4419	1.2537		344.19	-125.37	578.30	344.14	-0.05	-0.36	7.68
MD6+	5.7843	-1.5345	-3.3341	225	344.26	127.25	578.43	344.19	-0.07	-1.52	7.81
MD6-	5.7881	-3.3151	-1.5585		344.61	-124.21	578.81	344.35	-0.27	-1.52	8.18
MD7+	5.7876	1.2596	-3.4455	270	344.55	125.96	578.76	344.32	-0.22	-0.23	8.13
MD7-	5.7826	-1.2549	-3.4435		344.35	-125.49	578.26	344.12	-0.23	-0.24	7.63
MD8+	5.7767	3.3105	-1.5539	315	343.96	124.21	577.67	343.88	-0.08	1.52	7.05
MD8-	5.7777	1.5344	-3.3340		344.25	-127.25	577.77	343.92	-0.33	1.52	7.14