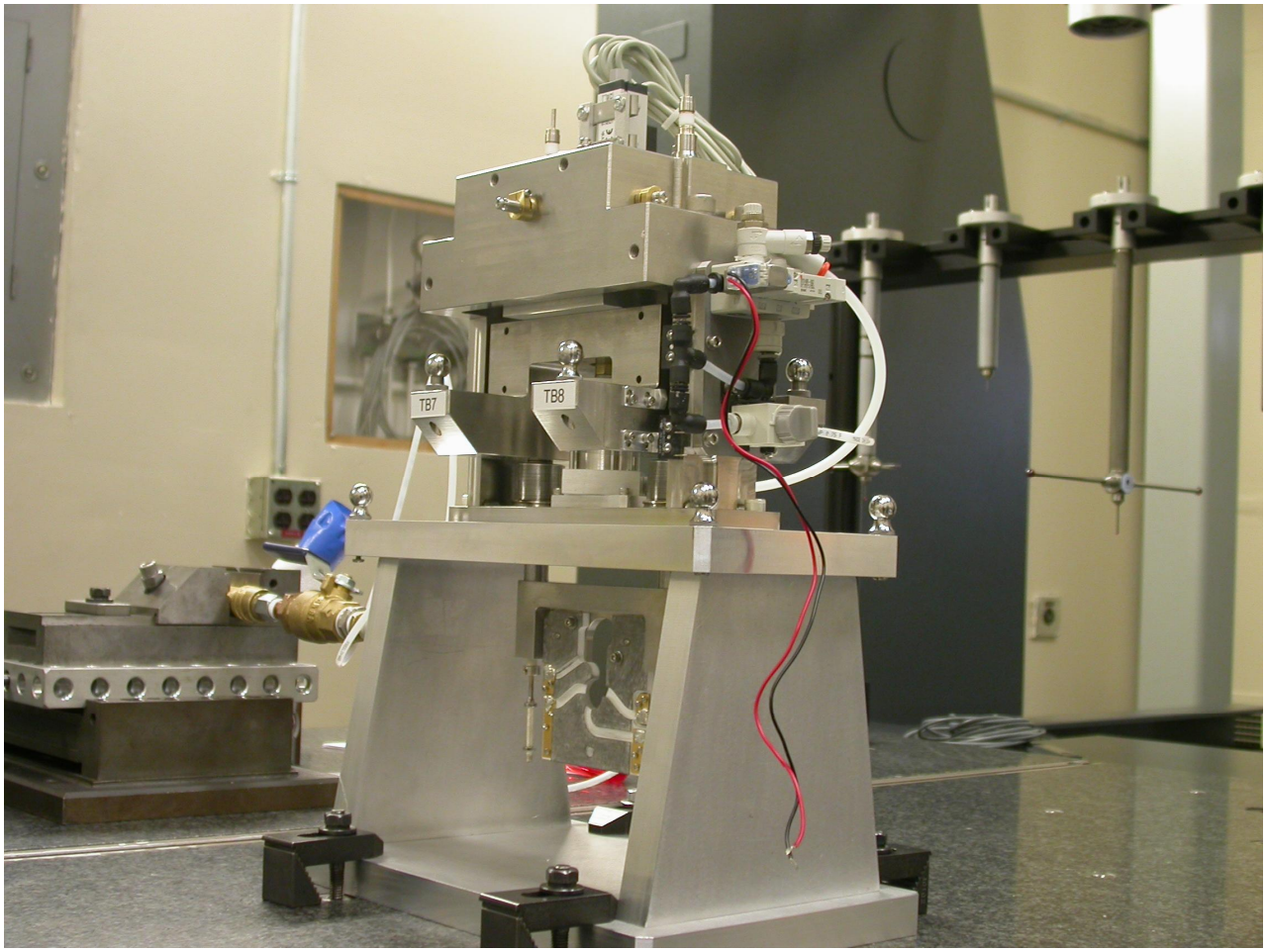
Linac Coherent Light Source

Stanford Linear Accelerator Center

Stanford Synchrotron Radiation Laboratory

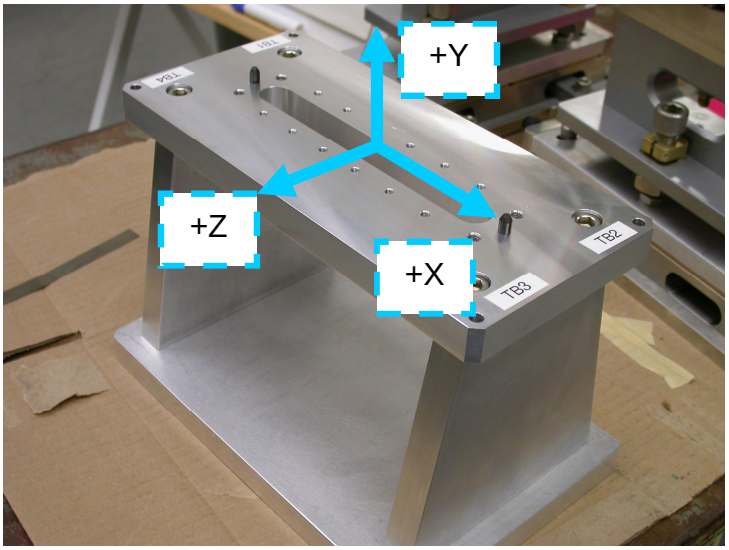
LCLS BFW WIRECARD ASSY INSPECTION/FIDUCIAL REPORT



Inspector:	Keith Caban
Responsible Engineer:	Don Schafer
Date:	Thursday, September 25, 2008
Work Order/Charge No.:	23800-1
Serial Number:	BFW – 03 / VC – 03 / WC – 03 / BASE – 06
Units of Measure:	Metric – Millimeters (mm.)
URL	http://www-group/met/Quality/FIDUCIAL%20REPORTS/LCLS%20BFW/BFW-03_VC-03_WC-03_BAS-06.pdf

Coordinate System Setups

Bench CSY (BENCH$CSY)
(The only CSY in Both States of measurement - out and under vacuum)

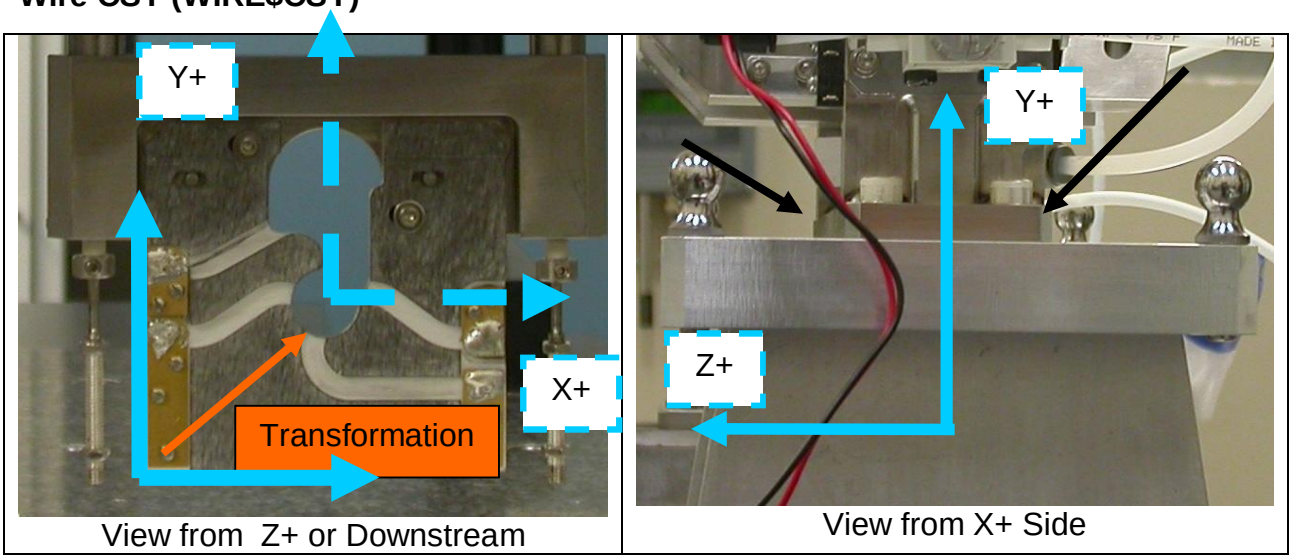


a) Plane measurement on top of Bench to set zero in Y and is the Spatial Alignment.
b) Measure Pin and Diamond Pin to get centers, create a line between the two center points and this sets zero in Z and is the Planar Alignment.
c) Take the symmetry point of the two pins this sets zero in X.

Bench Tooling Ball CSY (BTB$CSY)
a) Create a plane using Tooling Balls 1, 2, & 3
    a. This sets Zero in Y and is the spatial alignment
b) Create an axis/line using TB's 2 to 1 (+X)
    a. This is the planar alignment
c) TB 2 is a single point that sets zero in X, Y, Z.

BFW Tooling Ball CSY (BFWTB$CSY)
a) Create a plane using Tooling Balls 5, 6, & 7
    a. This sets Zero in Y and is the spatial alignment
b) Create an axis/line using TB's 6 to 5 (+X)
    a. This is the planar alignment
c) TB 6 is a single point that sets zero in X, Y, Z.

Wire CSY (WIRE$CSY)



a) Back Plane (-Z) Side sets Zero in Z and is the Spatial Alignment
b) Looking from +Z Side, Bottom of Card Sets Zero is the Planar Alignment
c) The Intersection of the Left Side of the Card and the Bottom, sets Zero in X & Y

Wire offset from Edges per T. Nakashima's Optical Measurement

Wire	Wire Location	Wire Diameter
Vertical Wire (X Location from Card)	39.6287	0.0383
Horizontal Wire (Y Location from Card)	37.0203	0.0376

Support Stand CSY (BASE$CSY)

a) A plane on Torque Fixture sets Zero in Y and is the Spatial Alignment
b) The symmetry of the outer surfaces where "X" fine adjustments are sets zero in X.
c) A line where the Torque Fixture 2X Dowel pins sets zero in Z and is the Planar Alignment.

Beamline CSY (BEAMLINE$CSY)

a) Use the BENCH$CSY setup except use the Torque Fixture plate to set zero in Y and the Spatial Alignment, transform +258.67 in Y to replicate Theoretical Beamline Center
b) This coordinate system will tell us where the Wire Crosshairs are to a theoretical Beam Centerline.
c) The wires should be offset ~ -0.400 in X, -0.200 in Y.

Statistical Data (mm.)

Out of Vacuum

10 Cycles (10 recordings)

Card Locations

CSY = BENCH$CSY

STATS	X-POS CARD	X-INTPT CARD	Y-INTPT CARD
AVG.	0.01326	-40.11954	-95.13720
Range	0.04735	0.05499	0.00608
St. Dev.	0.01757	0.02048	0.00181

Wire Location

CSY = BEAMLINE$CSY

Stats	X	Y
AVG.	-0.40989	-0.21438
Range	0.04713	0.00765
St. Dev.	0.01751	0.00243
Nom.	-0.40000	-0.20000
RMS Tol	0.06500	0.03000

Transformation WIRE$CSY TO BENCH$CSY

Stats	X	Y	Z	APA_PXPY	PA_PYPZ	PA_PXPZ
AVG.	-0.40989	-58.21438	-2.89980	-0.12745	89.78871	90.01833
Range	0.04713	0.00765	0.02342	0.01166	0.00722	0.00300
St. Dev.	0.01751	0.00243	0.00845	0.00460	0.00242	0.00096
RMS Tol	0.06500	0.03000	-	-	-	-

Transformation WIRE$CSY to BFWTB$CSY

Stats	X	Y	Z	APA_PXPY	PA_PYPZ	PA_PXPZ
AVG.	94.67784	-160.26242	35.96923	0.11984	89.69677	90.09755
Range	0.00108	0.00073	0.00495	0.00054	0.00176	0.00171
St. Dev.	0.00030	0.00022	0.00137	0.00019	0.00062	0.00053
RMS Tol	0.06500	0.03000	-	-	-	-

Under Vacuum
10 Cycles (10 recordings)
TB 5-8 Locations
CSY = BENCH$CSY

TB 5	X	Y	Z
AVG.	94.27405	101.62454	-38.78624
Range	0.00511	0.00622	0.00280
St. Dev.	0.00172	0.00209	0.00097
RMS Tol	0.06500	0.03000	-

TB 6	X	Y	Z
AVG.	-94.60207	102.41988	-38.08367
Range	0.00488	0.00589	0.00300
St. Dev.	0.00175	0.00202	0.00103
RMS Tol	0.06500	0.03000	-

TB 7	X	Y	Z
AVG.	-51.09174	102.33596	67.57591
Range	0.00396	0.00329	0.00193
St. Dev.	0.00135	0.00105	0.00074
RMS Tol	0.06500	0.03000	-

TB 8	X	Y	Z
AVG.	51.49622	101.92488	67.21906
Range	0.00480	0.00335	0.00283
St. Dev.	0.00161	0.00131	0.00093
RMS Tol	0.06500	0.03000	-

Wire Location

CSY = BEAMLINE$CSY

Stats	X	Y
AVG.	-0.46754	-0.27058
Range	0.01222	0.00148
St. Dev.	0.00494	0.00044
Nom.	-0.40000	-0.20000
RMS Tol	0.06500	0.03000

Transformation WIRE$CSY TO BENCH$CSY

Stats	X	Y	Z	APA_PXPY	PA_PYPZ	PA_PXPZ
AVG.	-0.46591	-58.20675	-2.31692	-0.12148	89.64268	89.88341
Range	0.01222	0.00148	0.00149	0.00293	0.00037	0.00149
St. Dev.	0.00494	0.00044	0.00042	0.00121	0.00012	0.00054
RMS Tol	0.06500	0.03000	-	-	-	-

Locations of ¼-20 Jo-Plugs Cylinders Intersected into Plane projected 12.7mm away from surface replicating a ½" (12.7mm) offset to center of Tooling Ball.

CSY = BEAMLINE$CSY

INTPT	X	Y	Z
1	-26.84823	227.58876	68.58090
2	27.16408	227.57033	68.44907
3	79.61346	180.07157	-68.67904
4	-80.01894	180.14357	-68.28114