

Technical Evaluation Report
“Recommended Min/Max and Accuracy Values for Mapping FUV
Detector Segment B X-Dispersion Pixel Coordinates to Segment A
X-Dispersion Pixel Coordinates”

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1. RECOMMENDED VALUES

In the Technical Evaluation Report, COS-11-0010 ("Coordinate Transformation Between Segments A and B on the HST/COS FUV Detector"), a simple linear formula was introduced to map Segment B detector X-Dispersion pixel values to the same coordinate grid as Segment A X-Dispersion pixel values. At the request of Ira Becker, this TER attempts to place upper and lower bounds, and required accuracy on the values for the slope and intercept of this simple coordinate transformation.

Precise values of slope(s) and intercept(s) for the FUV Detector flight unit and flight spare will be available when they have been assembled, tuned and performance verified. Early hardware testing shows that the values will probably be near 1.0 for the slope, and less than +/-100 for the intercept. However, until the hardware has been flight qualified, it is not prudent to place overly restrictive constraints on the coordinate transformation values. Therefore, what follows are conservative recommendations for the upper and lower bounds, and accuracy of the slope and intercept.

	Minimum	Maximum	Accuracy
Slope	0	+5	5 decimal places
Intercept	-4096	+1024	5 decimal places

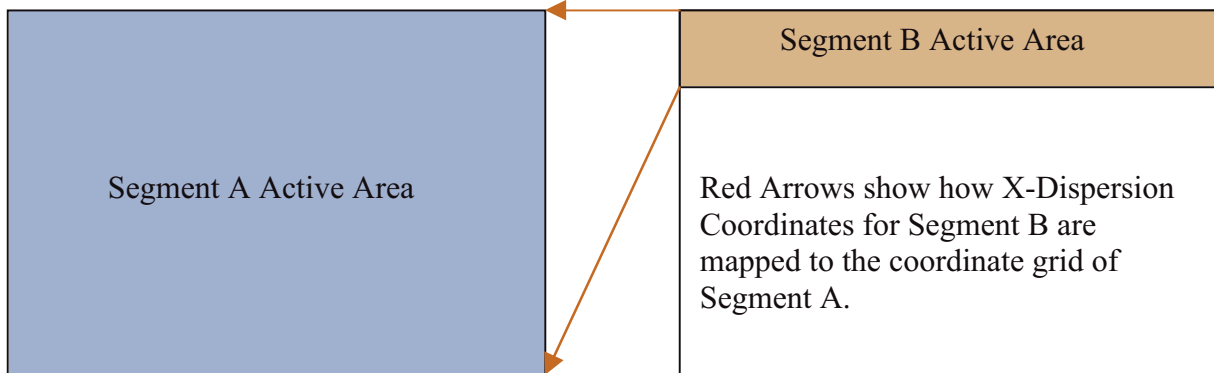
These upper and lower bounds come from reviewing a variety of coordinate transformation scenarios, using differing pixel sizes and pixel origins for Segments A and B. A "worst case" was assumed where the pixel size on Segment A was 5 times smaller than Segment B, and the Segment B active area was skewed to the upper limit of the X-Dispersion axis pixelization. This "worst case" transformation is shown graphically in the following section.

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2. EXAMPLE OF PIXEL COORDINATE TRANSFORMATION

"Worst Case" example for mapping X-Dispersion
 Coordinates for Segment B to Segment A



X-Disp Plate Size (mm)	10.00
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Number of X-Disp Pixels	1024
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Seg A Active/ Digitized Area Ratio	1.00000
Seg B Active/Digitized Area Ratio	0.20020

Seg A Pixel Size (microns)	9.77
Seg B Pixel Size (microns)	48.78

Seg A Active Area Min X-Disp Pixel	0	Map B to A Grid	Error
Seg B Active Area Min X-Disp Pixel	819	0	0.00160

Seg A Active Area Max X-Disp Pixel	1024	Map B to A Grid	Error
Seg B Active Area Max X-Disp Pixel	1024	1024	0.00200

Slope	4.99512
Intercept	-4091.00488

Decimal Accuracy	5
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