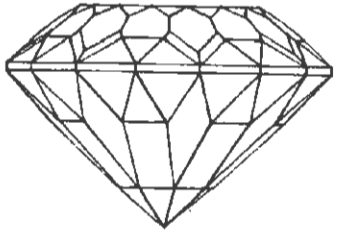

Fig. 1 Stacked

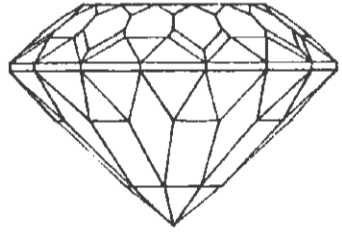

Fig. 2 Unstacked

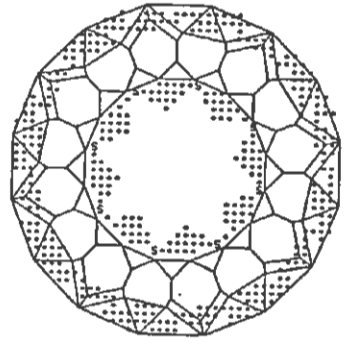

Fig. 3 Stacked b-PLOT

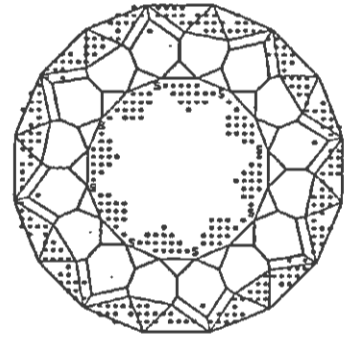

Fig. 4 Unstacked b-PLOT

DESIGN CONSIDERATIONS FOR DESIGN 1.373 JFG #3

Table size was not specified in the original instructions but I have assumed 55% Flat to Flat. STAR facets are "floaters" as far as the facets which touch the girdle are concerned. Measurement or just plain eyeball estimation is all the cutter can do.

Star facets are to be uniform size which implys steps C4 and C5 facets must be cut at the SAME HEIGHT and ANGLE. Similarly the drawing implys equal girdle segments so we have a natural ECED preform.

Given diagram is for CCW (counterclockwise) indexing. Using the unchanged indexing on a CW (clockwise) machine would give the chevron facets on the crown (and the split horizontal mains on the pavilion) on opposite sides of the 96-48 transfer axis. This might "unstack" the split mains on the crown and pavilion. so they do not line up (as seen in the side view). See Fig. 1 for the "stacked" condition and Fig 2 for the "unstacked" condition. Instructions in the reference show a side view comparable to Fig. 1 so for competitive purposes the "stacked" version is intended. An "unstacked" version can be changed to a "stacked" design by rotating the crown 22.5 degrees (6 gear teeth on a 96 index gear i.e. equivalent to one contiguous girdle segment) regardless of whether you have a CW or a CCW machine..

Fig 3 and Fig 4 are the "brightness" diagrams for the two conditions developed by using computer ray tracing. assuming RI 2.17 (for Cubic Zirconia), uniform light , and 0 deg view angle. Here an "*" represents a sample in which the light ray leaked out the pavilion and clear areas within the diagram represent rays that exited thru the crown in the normal manner. An "S" symbol indicates a light ray sample that was trapped within the stone and could not exit before trapped ray limit was reached (computation STOP). As you can see the two patterns are similar , but different.

Both designs have a fairly bright center except for some shadows caused by leakage thru the Step 3 pavilion facets and thru the steep facets next to the girdle. Not shown here is a b-plot for a modified design which shows the table dark areas can be completely eliminated by changing Step P4 from 43.0 degrees to 41.0 degrees (and changing all other angles according to the Tangent-Ratio formula). Plan views are unchanged, but pavilion depth is decreased. This would be a brighter stone, but as in the "unstacked" facet arrangement would not strictly comply with the competition requirements. I have no idea whether the judges will be critical enough to pick this up or not.