Instructions for plate DAC* assembly.

A. Mounting conical Boehler-Almax diamond anvils into carbide seats.

1. Remove old diamond by tapping with steel pin.
2. Clean seat and diamond thoroughly. No dust grains should be visible on the conical surfaces under the binocular.
3. Insert diamond in the cone of the carbide seat and put the assembly under a glueing fixture.
4. Put glue between the rims of the diamond and the seat. The conical seat should be free of glue. We advice the following glues, depending on your application:
    a. Normal and laserheating experiments: Hysol 9514 of Loctite (cures in 30 minutes at 130° C)
    b. External heating experiments: Resbond 908 of Cotronics (cures in 30 minutes at 120 °C).
5. Make sure to put $\pm$10 kg of weight on the anvils during curing.

B. Mount carbide seats into plate DAC.

1. Press the upper seat into the upper plate using a press. Push only on the seat and not the diamond (for example with a thick-walled brass tube). Make sure that carbide seat is fully inserted.
2. Insert lower seat using the three little setscrews. No alignment or centering necessary yet.

C. Cell alignment.

1. Measure both plate heights including diamond with calipers to ±0.01 mm.
2. Remove lower seat.
3. Bring both plates together (line up arrows) and adjust the total height of the DAC with the outer M6 screws. This height is obtained by adding up the two plate heights including the diamonds and the initial gasket thickness. The plates should be parallel to within ±0.01-0.02 mm. The precision in the total height should be within –0.03 to +0.1 mm.
4. Insert lower seat and roughly center it using the three inner small set-screws .
5. Clean both diamond culets with isopropanol until no dust grains are visible under the binocular.
6. Bring plates together and insert fine-threaded pressure screws (these should be coated with some Molykote grease).
7. Tighten screws with torque wrench (supplied). Go around 2 times.
8. Turn screws with the gearbox until diamonds nearly touch each other. This should be done under binoculars using bottom illumination and by holding the plates vertically.
9. Align culets with the cell in the horizontal position using the three small inner set-screws (this is not the final horizontal alignment).
10. Bring diamonds into contact using gear box (cell in vertical position). If you are not experienced, use small steps as pressure builds up fast after diamond contact!

11. Check for interference fringes in the horizontal plate position. Use suitable illumination in your binoculars for best fringe contrast. Polarized light from above is best.
12. Mark position where diamonds touch first.
13. Untighten pressure screws using gearbox.
14. Increase plate distance at the mark with one of the three outer M6 screws (for example with 1/10 of a turn) and repeat nr. 7 to nr. 14 until the amount of fringes is minimal (preferably zero). During this process you should finalize the horizontal alignment of the culets using the three small inner setscrews. This alignment is most accurate when the diamond touch each other.

D. Hints for gasket preindentation (the plate DAC has a unique precision gasket holder).

1. Mount gasket on the bottom side of the gasket holder off-center to allow multiple use. Use rapid glue or epoxy with heat.
2. Mount gasket holder making sure that it is parallel to the plate. This guarantees reproducibility upon remounting.
3. Mark gearbox to provide a reproducible relationship between the number of turns and final gasket thickness.

* *R. Boehler, Rev. Sci.Instr. 77. 115103, (2006)*