D0 ENGINEERING NOTE

No. 3823.112-EN-415

D0 SILICON UPGRADE

LADDER ASSEMBLY SEQUENCES

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3 Chip Ladder Assembly Mechanical Requirements

August 17, 1994

This is an abridged version of the assembly sequence described by the D0 assembly subgroup of Cooper, Hrycyk, Kowalski, Rapidis, and Ratzmann. This primarily is used to indicate major steps during the sequence and to list fixturing requirements.

Assembly

1. Place support rails in (1) 3 Chip Ladder Construction fixture. The two rails get held under vacuum.

2. Apply adhesive to the region where contact will be made with the beryllium substrates.

3. Place underside beryllium pieces (active and dummy ends) into the (1) 3 Chip Ladder Construction fixture. These pieces get placed in the fixture against the appropriate pins to mimic final positioning in the bulkhead. Apply vacuum to the beryllium pieces. Allow to cure?

4. Align silicon in (1) 3 Chip Ladder Construction fixture. Reference features on the fixture will be parametrized. Holes in the fixture near the silicon center line will be targeted to set the silicon axis relative to the beryllium slot edge. Z positioning of the detectors will be achieved by shimming between the detectors and butting up the end of the silicon against the fixture.

5. Remove silicon detectors and apply adhesive to the rails and upper surfaces of the beryllium.

6. Replace silicon and check final position of the detectors.

7. Release vacuum on the rails so they cure in a stress-free state. Allow adhesive to cure.

8. Apply adhesive and align HDI to the silicon using (2) 3 Chip HDI Gluing fixture. The HDI will have tabs which are held by the fixture for location relative to the detectors. Allow adhesive to cure.

9. Move ladder to (3) 3 Chip Wirebonding Fixture. Transfer fixture to the wirebonder and bond chip-silicon and silicon-silicon.

Fixturing

(1) 3 Chip Ladder Construction

(2) 3 Chip HDI Gluing

(3) 3 Chip Wirebonding Fixture

** Adhesive curing in steps 3, 7, and 8

5 Chip Ladder Assembly Mechanical Requirements

July 12, 1994

This is an abridged version of the assembly sequence described by the D0 assembly subgroup of Cooper, Hrycyk, Rapidis, and Ratzmann. This primarily is used to indicate major steps during the sequence and to list fixturing requirements.

Assembly

1. Align butterfly HDI onto phi and stereo side beryllium pieces and glue in (1) 5 Chip Butterfly Gluing. Alignment for this step is not critical for alignment, but only for the final wirebonding from chip to silicon so mils of error in placement will not severely impact the assembly. Hold for adhesive cure.

2. Glue SVX chips onto the HDI using (2) 5 Chip SVX Positioning and Gluing. Allow adhesive to cure.

3. Wirebond chips to HDI and transceivers to HDI in (3) 5 Chip Butterfly Wirebonding.

4. Burn-in on (4) 5 Chip Testing Vacuum Chuck. The chuck needs to be cooled and in a dry environment.

5. Align and glue slotted HDI to phi side of crystal in (5) 5 Chip HDI Gluing. The slots on the beryllium locate the ladder to the bulkhead so alignment is critical for this step. Presumably an axis (along the phi strips) will be set with pins on the fixture and the silicon will be placed relative to the fixture. Allow adhesive to cure.

6. Wirebond Phi side in (6) 5 Chip Wirebonding. The double sided crystal will fit into a carrying tray which goes onto the wirebonding fixture. It must have the appropriate cutouts and removable shims to support the crystal for both phi and stereo side wirebonding. This will likely be in a base plate which holds the support tray.

7. Flip the crystal, align and glue the stereo side HDI to silicon. This may be done in (5) 5 Chip HDI Gluing, or it may be a mating fixture which handles the assembly at this point. Alignment is not critical beyond wirebonding requirements for this step. This may require a hinged fixture if the 'hinge' of the HDI is not flexible enough to work with. Allow adhesive to cure.

8. Wirebond stereo side of the crystal (6) 5 Chip Wirebonding.

9. Align phi strips of the two crystals in (7) 5 Chip Ladder Construction. Constrain the two crystals (vacuum ?), move to wirebonder and bond phi side silicon-silicon.

10. Position and glue support rails to the phi side. Allow adhesive to cure.

11. Flip ladder and wirebond stereo side of the ladder in the (6) 5 Chip Wirebonding.

Fixturing

- (1) 5 Chip Butterfly Gluing
- (2) 5 Chip SVX Positioning and Gluing
- (3) 5 Chip Butterfly Wirebonding
- (4) 5 Chip Testing Vacuum Chuck
- (5) 5 Chip HDI Gluing
- (6) 5 Chip Wirebonding
- (7) 5 Chip Ladder Construction

** Adhesive curing in steps 1, 2, 5, 7, and 10.