



DOCUMENT TITLE:

Flex Cutting Procedure

PRODUCTS AFFECTED:

OPTera Connect PX

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## REVISION HISTORY

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## 1.0 PURPOSE

Flex cutting is a manufacturing sub-assembly process for All-Optical Cross Connect Module. This procedure provides instructions and how to use the tool for removing flex tab and excess Z-axis film (ZAF).

## 2.0 SCOPE

Currently there are two different manufacturers for the flex, M-flex and HEI. The provisions outlined in this procedure shall apply to the manufacturing process for this flex-substrate assembly inside the clean room.

## 3.0 TOOLS AND EQUIPMENT NEEDED

- 3.1 Flex Cutting Fixture: Part Number: PX000056
- 3.2 Cleaning Fixture: Part Number: PX000060
- 3.3 Cleaning tool (Pick & Xacto Blade)
- 3.4 Microscope
- 3.5 Cleaning Cloth
- 3.6 Alcohol

## 4.0 REFERENCES

- 4.1 Substrate Specifications PRD-0157
- 4.2 Flex Specifications PRD-0196
- 4.3 Hot Bar Bonding Procedure WIP-0104

## 5.0 DEFINITIONS

- 5.1 All-Optical Cross Connect sub-assembly component.

## 6.0 RESPONSIBILITIES

- 6.1 Operator must have proper training of how the process works and thoroughly understand how to use the tool effectively. Handling the Flex must done with care.
- 6.2 Manufacturing Engineer is responsible for updating this documentation and maintaining the performance of the fixture.

- 6.3 Quality engineer must notify Manufacturing Engineer and Mechanical Design Engineer if any changes in design or specification for the flex or substrate.

## 7.0 PROCEDURE

Flex cutter is designed to remove the tab in one clean cut. The rotary blade is an off the shelf item. This fixture is designed to reduce the possibility of damage to the polyimide and the flex during removal of tab and excess ZAF.

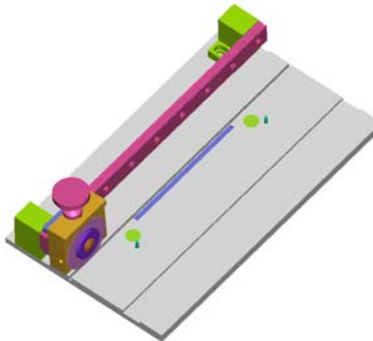


Figure 1: Loading Position

### 7.1 Preparation

- 7.1.1 Clean the cutting fixture using soft wipes dampened in alcohol.
- 7.1.2 Blow out the dust on the fixture. (See Figure 4)
- 7.1.3 Remove flex holding bar. (See Figure 4)
- 7.1.4 Examine the hot bar bonding line on the flex and the substrate if any open or any particle on the front surface of the substrate. (See figure 6)

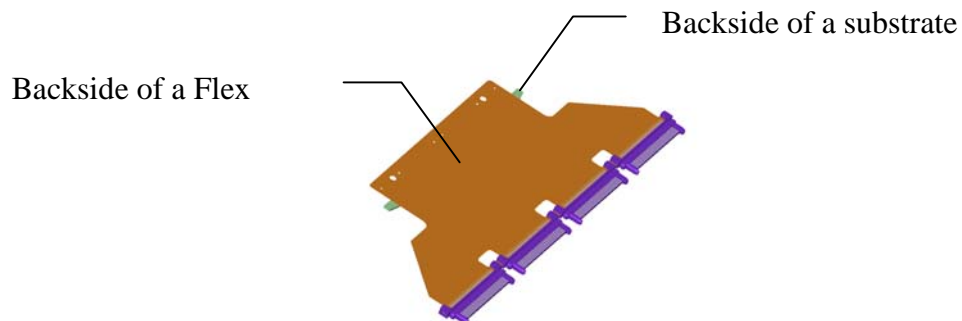


Figure 2: Flex-Substrate Assembly

## 7.2 Cutting

7.2.1 Place the flex-substrate assembly into flex cutting base. Make sure that the front of the substrate face down and in line with groove. See figure below

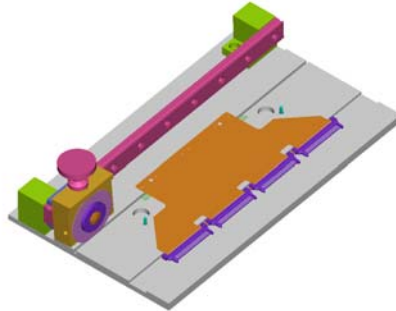


Figure 3: Loading Flex-Substrate Assembly

7.2.2 Gently place flex clamping bar over the flex assembly using the guide pin to position the bar.

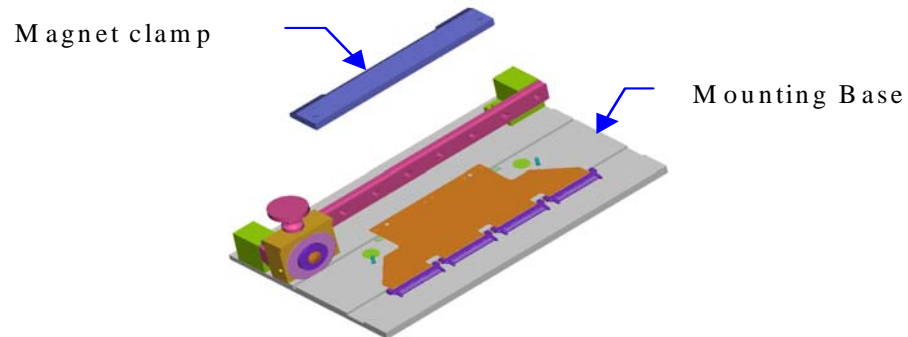


Figure 4: Placing the clamp

7.2.3 Perform a cut by slowly sliding the blade holder to the opposite side. The separation of the flex should appear. If not the operator should do another cut after returning the blade holder back to the original place. The removal of tab should be complete at this time.

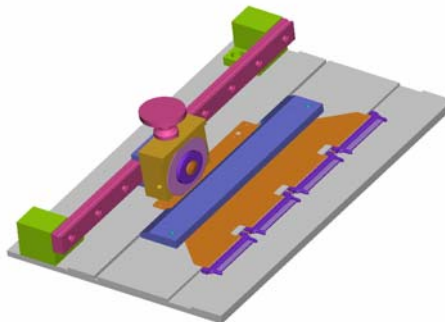
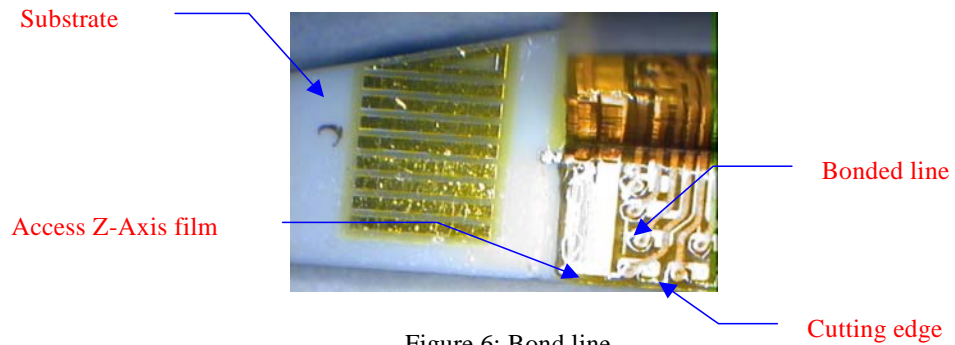


Figure 5: Cutting the flex

7.2.4 Remove the flex holding bar and remove the Flex-Substrate assembly from the fixture. Examine the cut for the quality assurance based on the criteria below:

- a. No damage to flex pad.
- b. No damage on the polyimide on both front and back of the substrate.
- c. No separation (open) at the bonded line between the substrate and the flex.
- d. No damage to vacrel



### 7.3 Removing the excess ZAF

7.3.1 Exam the cleaning stage for the cleanliness. See figure 8 below

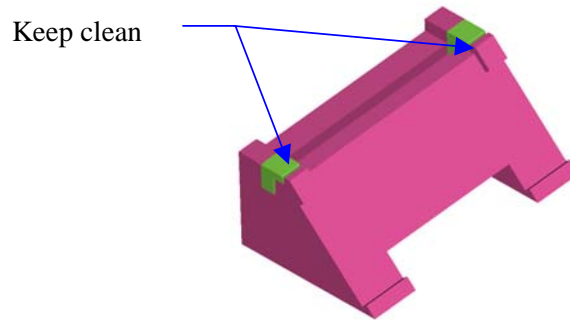


Figure 8: Cleaning Stage

7.3.2 Place the Flex-Substrate assembly on the cleaning stage as show below by pressing it down. The clamp will move backward and will hold the Flex-Substrate in place. Make the flex side is face up.

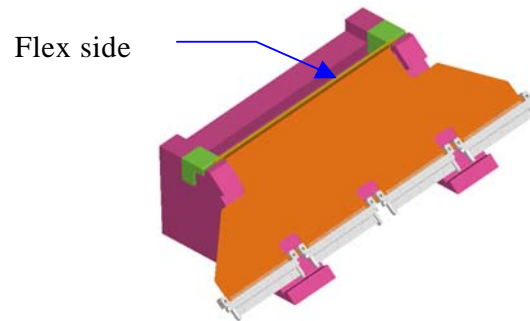


Figure 9: Removing ZAF

7.3.3 Remove ZAF with cleaning tool under microscope.

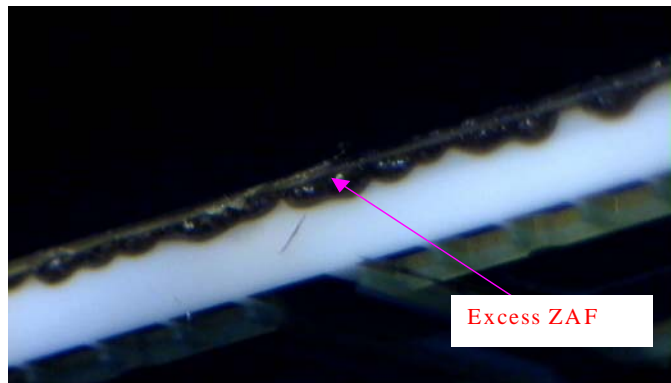


Figure 10: Excess ZAF

7.3.4 Blow off the particles after complete removal of the excess ZAF.



Figure 11: Clean surface, access ZAF completely removed

7.3.5 Inspect assembly for contamination and particles.

## 8.0 PREVENTIVE MAINTENANCE

- 8.0.1 Cutting fixture designs to overcome the cutting problem from using the Xacto blade. The rotational blade will wear off if the cutting is greater than 50-70 cycles. The blade needs to change for the sharpness.
- 8.0.2 Cleanliness of the substrate groove and cutting groove is essential. Cleaning before and after use is required.
- 8.0.3 The guiding hole for the pins may wear off. Top plate may need replacement after 20,000 cycles.
- 8.0.4 The rare earth magnet may need to replace if become weak.
- 8.0.5 The cleaning stage may need to change a spring plunger if the spring force is weakening.