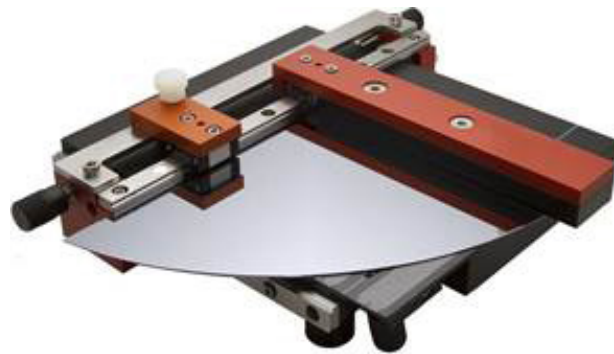


INSTRUCTIONAL MANUAL
CAT. #7670

FlipScribe™



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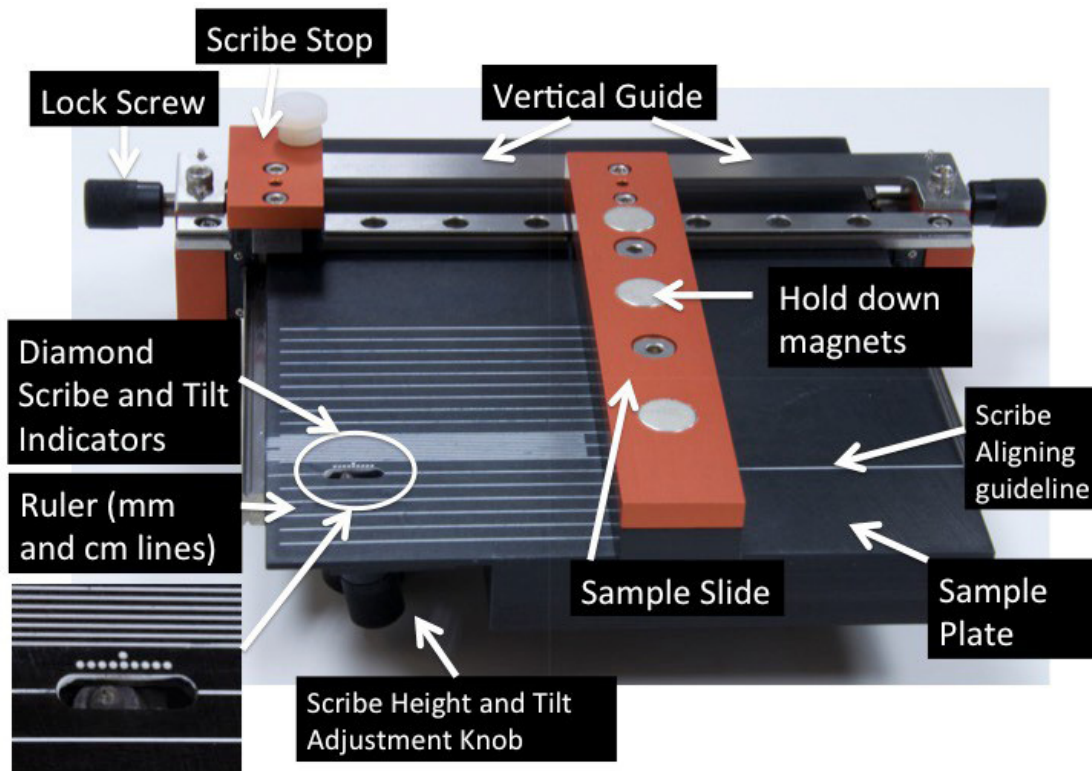
Overview

The FlipScribe enables cleaving through frontside targets with a scribe made on the backside of the substrate. This methodology is required for cleaving bonded substrates and used for crystalline and amorphous samples with sensitive devices on the frontside as contamination from the scribing process is eliminated. Coupling the FlipScribe™ with an optical microscope improves cleaving accuracy and repeatability. Use the point of the diamond scribe to cleave the sample using “flipscribe and cleave” process making it a very quick tool for cleanly downsizing large samples.

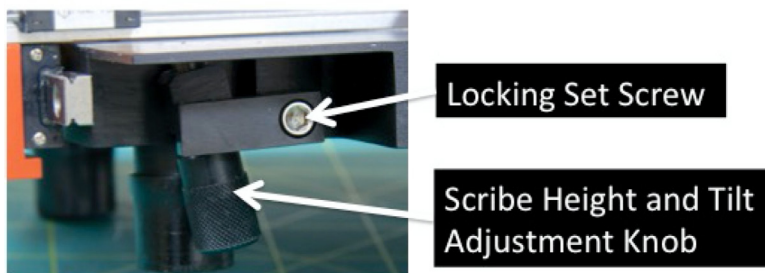
The main components of the FlipScribe™ are described below and shown below:

1. Sample platform using a fence guide design. Orthogonal vertical and horizontal sample slide fence guides are used for alignment and scribing of the sample.
2. A ruler is embedded in the sample surface for quick sample measurement and sizing.
3. Scribe stop allows scribe length to be defined.
4. Diamond scribe with height and angle adjustment. **NOTE:** Diamond scribe is a consumable and provided in a user exchangeable cartridge.

FlipScribe overview



Locking set screw and scribe height and tilt adjustment knob.



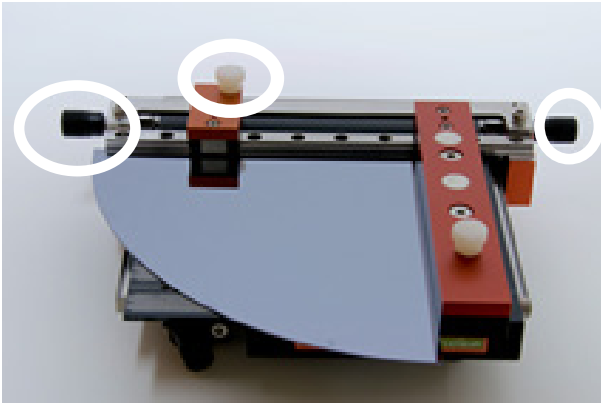
Replaceable diamond scribe and adjustment knob.



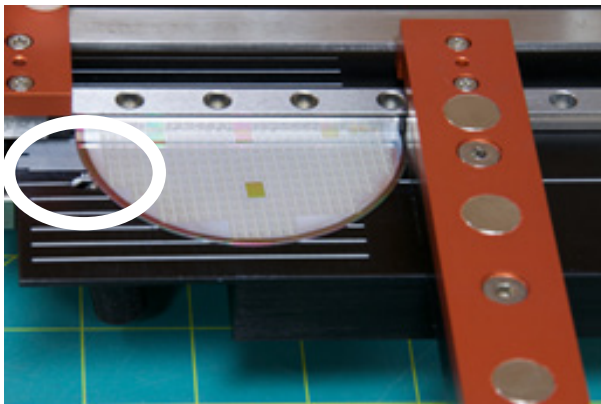
Using the FlipScribe™

The following description describes positioning, scribing and cleaving the sample.

Positioning the Sample



1. Loosen the vertical position lock screw and the adjustable slide stop screw.
2. Place the sample with one corner against the vertical guide and the other against the sample slide.



Wafer sample aligned against vertical guide and sample slide.

3. Position the sample for scribing by pushing the slides such that the area of interest is touching the linear facet of the diamond scribe.
4. Once the target is positioned, tighten the vertical guide locking screws.

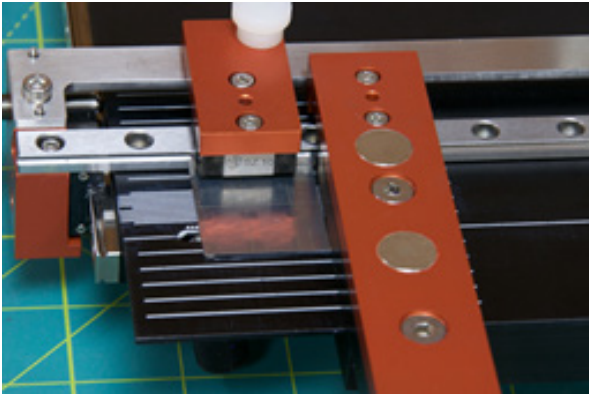


5. It is very useful to use the Flipscribe with an optical microscope. Set the Flipscribe such that the diamond scribe is centered in the field of view at the lowest magnification.

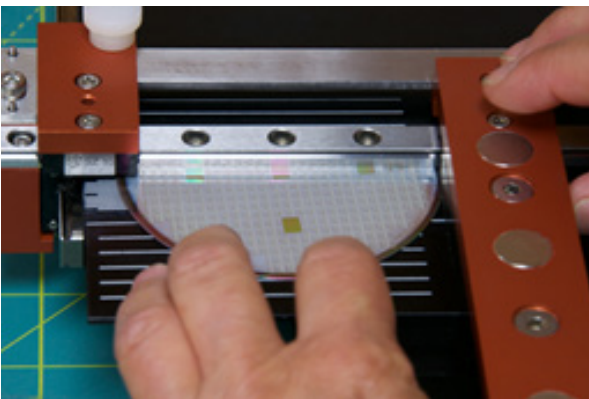
NOTE The diamond scribe can be aligned by while viewing under the stereoscope. Turn the knurled knob to adjust the scribe height. Tilt is adjusted by tilting the knife along the tilt alignment indicators, using them as reference points.



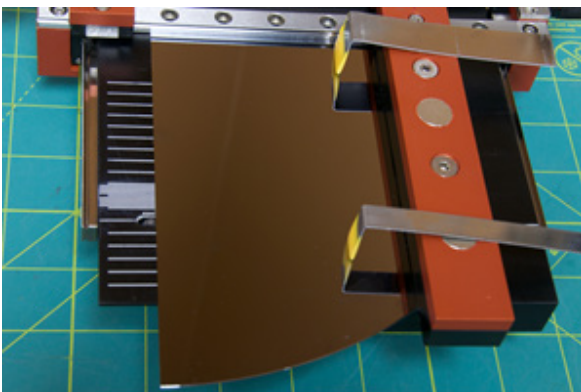
Setting the Scribe Length and Scribing the Sample



1. Setting the Scribe length.
Use the adjustable scribe stop to set the length of the scribe.
 - a. For a short scribe lock the scribe stop several millimeters from the horizontal position slide.
 - b. For a long scribe move the slide stop away from the horizontal position slide.
 - c. For a scribe that extends across the length of the sample move the scribe stop as far away from the horizontal position slide as possible.



2. Scribe the sample.
 - a. Scribe the sample by pushing the sample over the diamond scribe with the horizontal position slide. Use your fingers to hold the sample down during the scribing to prevent the front edge from rising during the sliding motion.



- b. Alternately, using the magnetic hold/downs as shown in image at left, keep the sample flat during scribing.

Cleaving the Sample

Each example follows a 3 pt cleave approach. Note that after scribing the sample can be cleaved by:

Cleaving by Snapping

Grab the sample with the scribe facing up with both hands, typically using the thumb and middle fingers approximately 10 mm from the scribe and bend the sample away from you. It will cleave along the direction of the scribe.

Cleave the Sample Over a Pin

Lay the sample with the scribe facing up over a paper clip, needle, fine wire or other pin. Push with fingers symmetrically on either side of the scribe until the sample cleaves.

Cleave using the FlipScribe

Use the scribe point of the FlipScribe to cleave the sample.

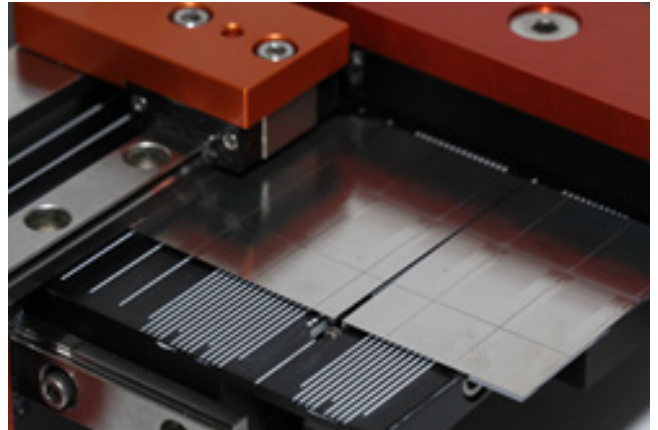
Push with fingers symmetrically on either side of the scribe until the sample cleaves.

NOTE: Using this method when performed under a stereoscope allows the user to view the sample while it is cleaving, thus providing better control of the positioning and cleaving pressure.

Application Notes

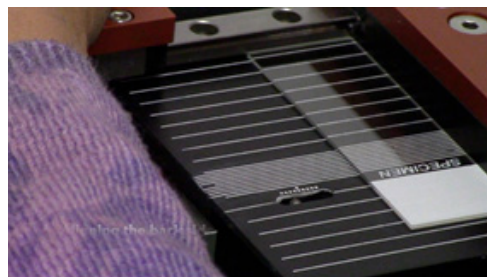
Scribing crystalline materials

The best results for crystalline materials are obtained when using a short scribe. This results in a cleave along the crystal plane. In some cases if the leading edge of the sample is uneven or curved, a long scribe is required to initiate the cleave.



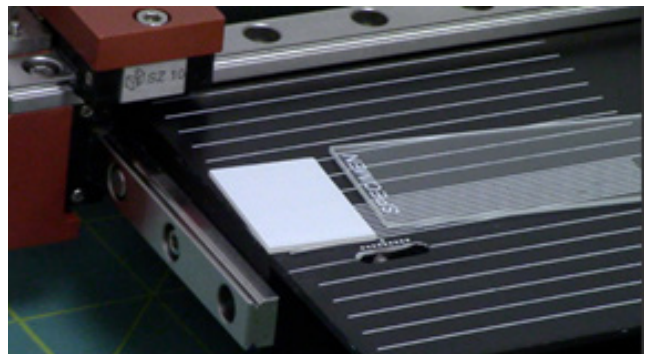
Scribing amorphous substrates

Amorphous and polycrystalline materials require the scribe to extend across the entire sample. In some cases a short scribe can be used to initiate the sample fracture, this produces a very clean edge desirable for SEM. The fracture is typically not straight but this is a good method if accuracy is not required.



Glass slide sample.

Note: For glass, a deep scribe is not required. Table 1 gives a summary of scribing parameters for different materials and applications.

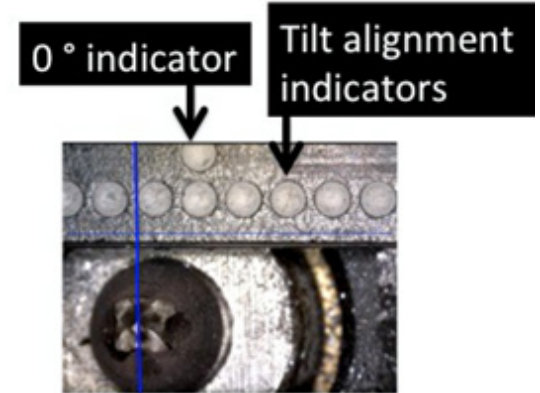


Adjustments and Maintenance

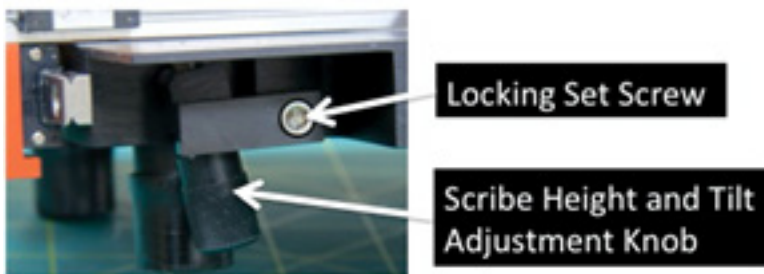
Scribe Height and Angle Adjustment

Default settings. The tool ships with the default settings as shown in image to the right. This setting can be used for crystalline materials.

NOTE: For very hard materials or those that scribing is counter to a crystal plane the height and angle can be increased to get a deeper scribe.



Exchanging the Diamond Scribe and Setting Tilt and Height



1. The FlipScribe scribe is mounted in a cartridge. Remove by loosening the scribe holder adjustment locking set screw.
2. Tilt FlipScribe UP and then pull the housing and scribe cartridge UP and away from tool to remove it.



3. After removing the old scribe assembly, drop in the new cartridge and housing.
4. Thread the scriber into the housing and gently tighten the locking set screw, as shown in the above left image.

Diamond scribe housing.



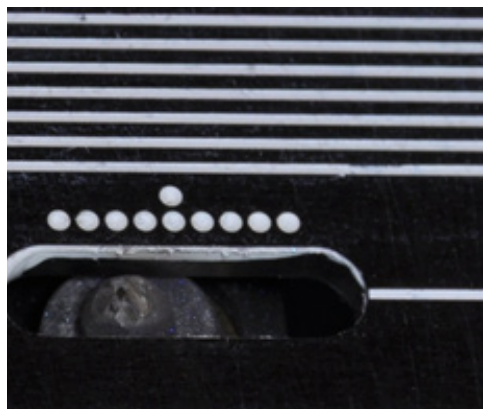
Cartridge and housing removed.



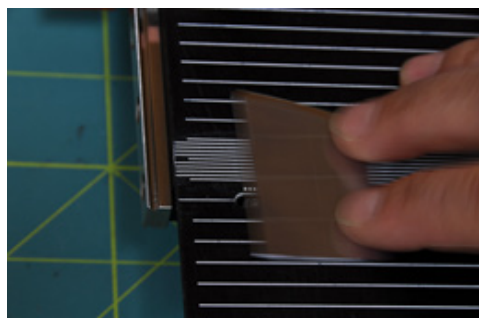
FlipScribe before installation of new cartridge.

Exchanging the Diamond Scribe and Setting Tilt and Height, continued

5. Set the default angle using the white tilt alignment indicators as a guide.
6. Set the default height. (Stereoscope recommended)
 - a. Set a flat sample on the tool in the proximity of the diamond scribe.
 - b. While moving the diamond scribe up, slide the sample over the scribe to determine when the tip is level with the tool surface.
 - c. Remove the sample from the tool.
 - d. While observing the tip with a stereoscope or magnifying lamp, turn the height adjuster and align the nearest facet edge with the long line embedded on the tool work surface.
 - e. Turn the height adjuster (counter clockwise) increasing the diamond scribe height a half turn and align to the nearest facet.



Set tilt by adjusting the tilt adjustment knob.

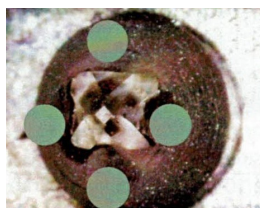


Slide sample over the scribe until it makes contact.



7. Observe the tip through a stereoscope or magnifying lamp and turn height adjuster, aligning the nearest facet edge so it is horizontal. It will be aligned with the long line embedded on the toolwork surface.
8. Turn height adjuster counter clockwise a quarter turn to increase the diamond scribe height and aligning to the nearest facet. The facet will still be horizontal as shown in the image to the left.

NOTE: If the FlipScribe is being used without a stereoscope or magnifying lamp, mark the sharp edges of the facets with a permanent marker. This will help to align the facets without a microscopy.



Scriber tip and position of facet marks.



Scriber tip with actual facet marks.

Scribe Guidelines

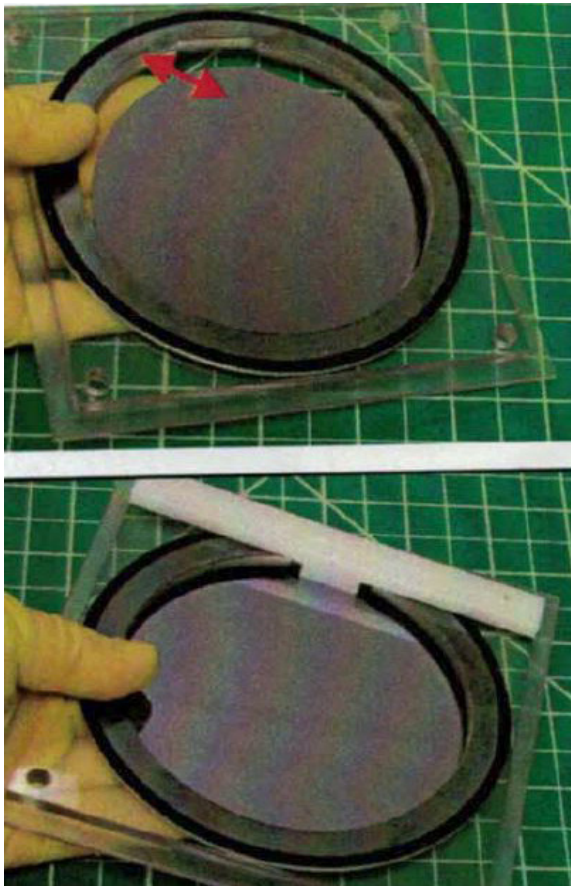
Material	Scribe type	Scribe depth	Length	Tilt	Height
Silicon/GaAs (100)	Short	Hairline	<1.5" (38 mm)	-2 dots	Standard
Glass	Full length	Hairline	Any	-2 dots	Standard

Loading a Sample in the Wafer Holder (2", 3" or 4")



1. To load a sample in the wafer holder you will need:
 - Wafer holder
 - White Wafer holddown
 - Wafer sample

Frontside of holder



Backside of holder

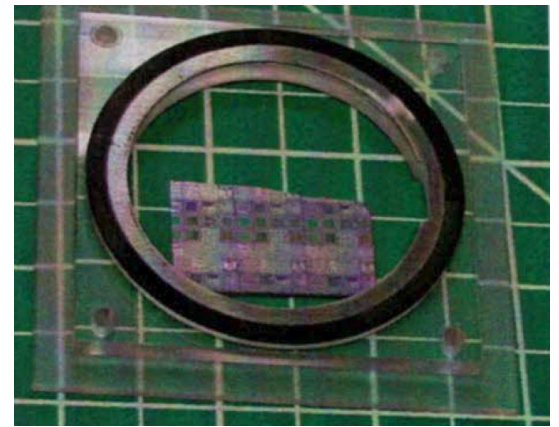
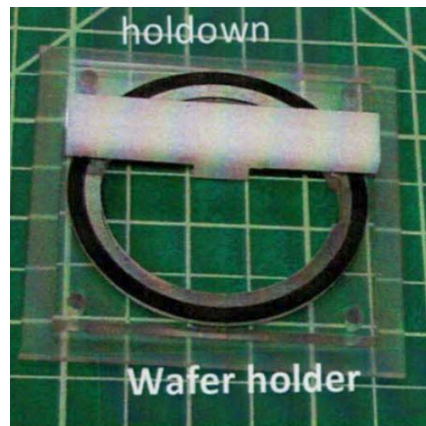


2. Pick up the wafer and load it into the holder from the back side of the holder
3. Orient the wafer flat so it is parallel with the detent in the wafer holder.
4. Place the holddown in the detent and press it up against the holder.

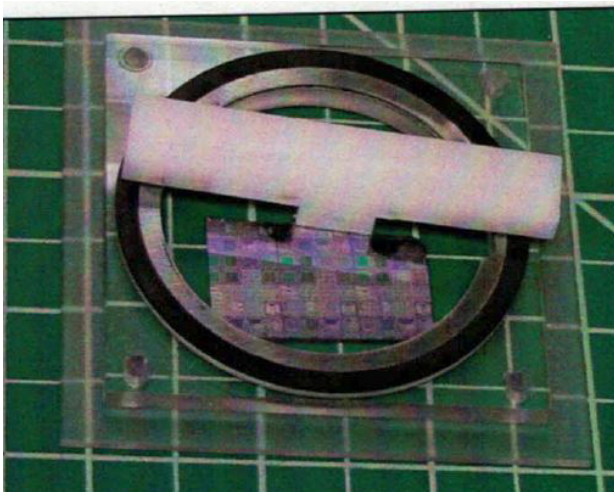
Loading a Wafer Piece in a Wafer Holder (2", 3" or 4")

1. To load a sample in the wafer holder you will need:

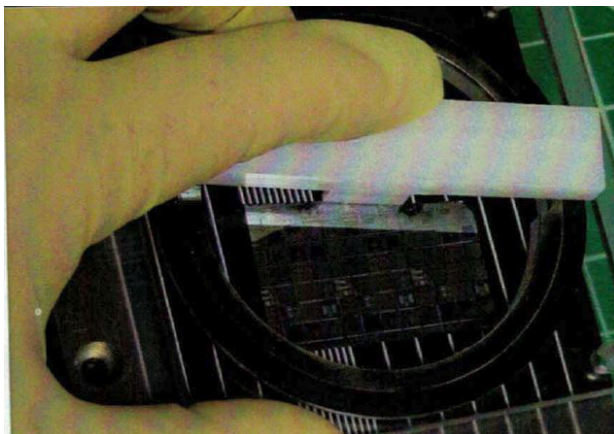
- Wafer holder
- Wafer holddown
- Wafer sample



Wafer piece set in holder.



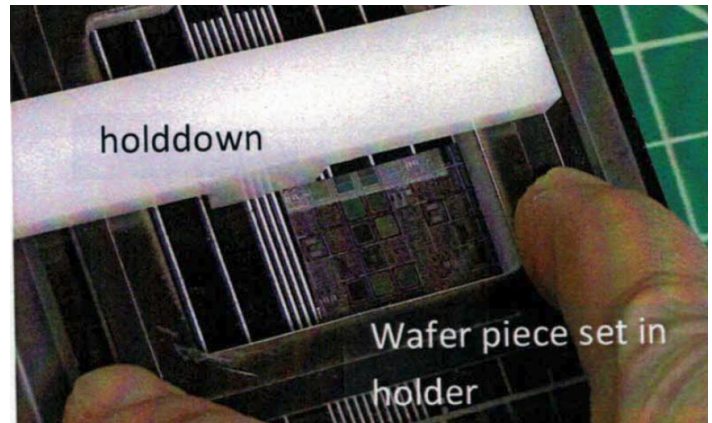
2. The holddown can be positioned in any rotation to hold the sample in place.



3. Place the holder with the sample on the FlipScribe.
4. Use the vertical guide to position the sample.
5. Scribe the sample by sliding it against the vertical guide.

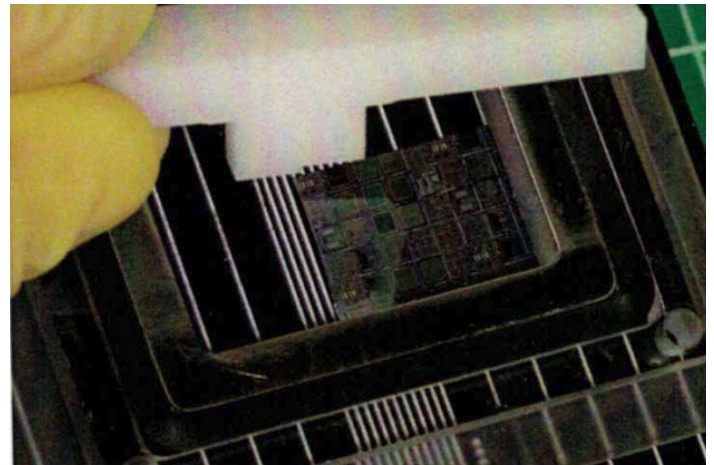
Loading a Wafer Piece in the Square Holder

1. To load a sample in the wafer holder you will need:
 - Wafer holder
 - Wafer holddown
 - Wafer sample

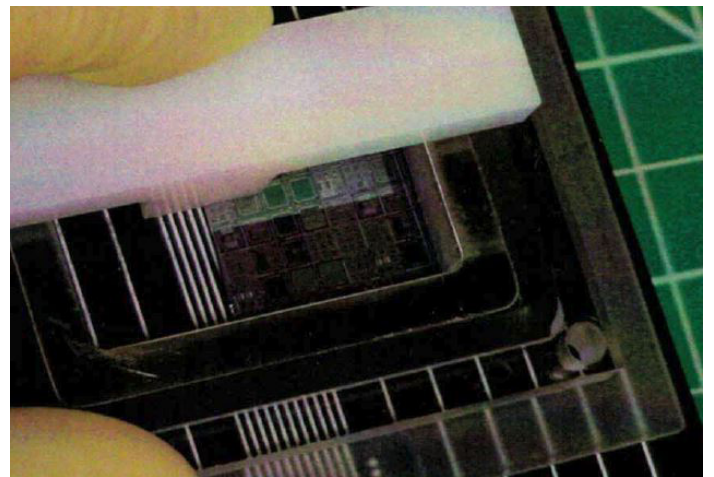


2. If the sample has good edges, close to 90° corners, slide the notch in the holddown over the corner of the sample. This will assure it doesn't move while scribing.

NOTE: If the sample has poor edges, use the holddown as shown in the top, right image.



3. Place the holder and sample on the FlipScribe.
4. Position the area of interest for scribing and lock the guides.
5. Slide the holder against the guide to scribe the sample.

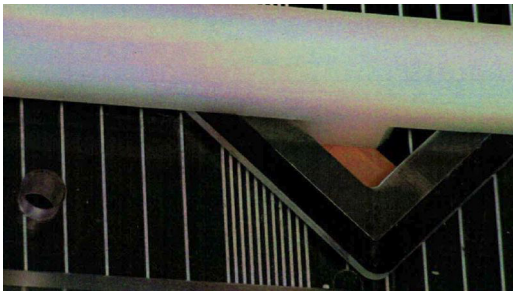


Loading a Wafer Piece in the 45° Holder

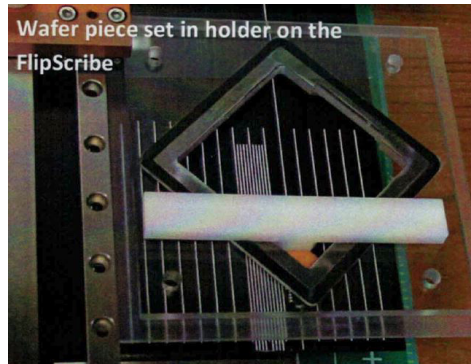
Wafer piece set in holder.



- To load a sample in the wafer holder you will need:
 - 45° holder
 - Holddown
 - Wafer piece



- Correct positioning of the holddown over the corner of the sample.



- 45° holder and sample on the FlipScribe.



- Scribe the sample by sliding it over the diamond scribe
- Use both hands to assure that the holder slides against the rail and the sample does not move during scribing.

Parts & Accessories

Catalog #	Description
7670-01	FlipScribe Replacement Cartridge
7670-02	2" Square Holder
7670-03	45 Degree Holder With Sample
7670-04	2" Round Wafer Holder
7670-05	3" Round Wafer Holder for FlipScribe
7670-06	4" Round Wafer Holder for FlipScribe