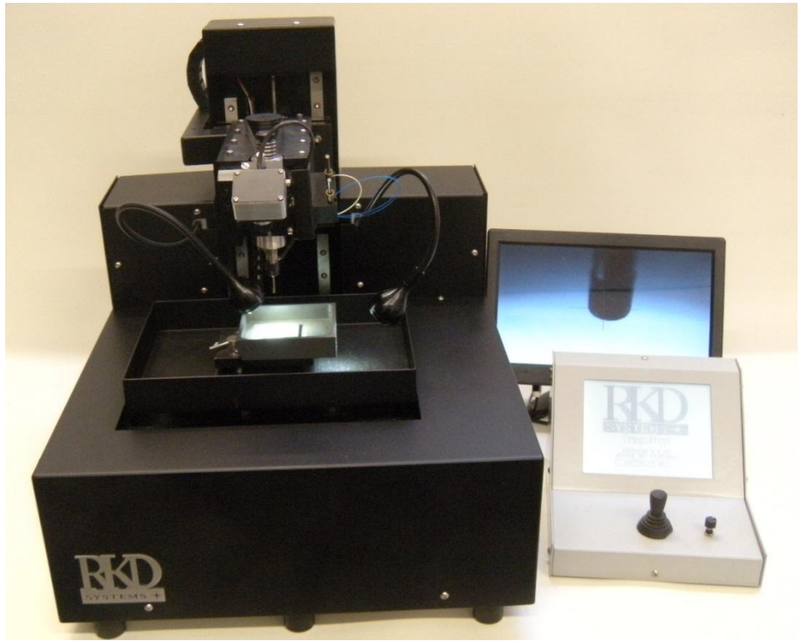
The OmegaPrep IIa And UltraPrep IVa

Easy to use, automatic, machining systems for all mechanical sample preparation needs



A partial list of sample preparation Die thinning and polishing

- Thinning results with tight thickness tolerance
- Thinning corrected for measured remaining silicon
- Encapsulant and die attach removal
- Heat sink removal
- Substrate delayering
- Substrate removal
- Stacked die removal
- C4 ball exposure
- Die front-side delayering
- BGA removal for PCB assembly rework



RKD SYSTEMS

The OmegaPrep IIa And UltraPrep IVa

System features

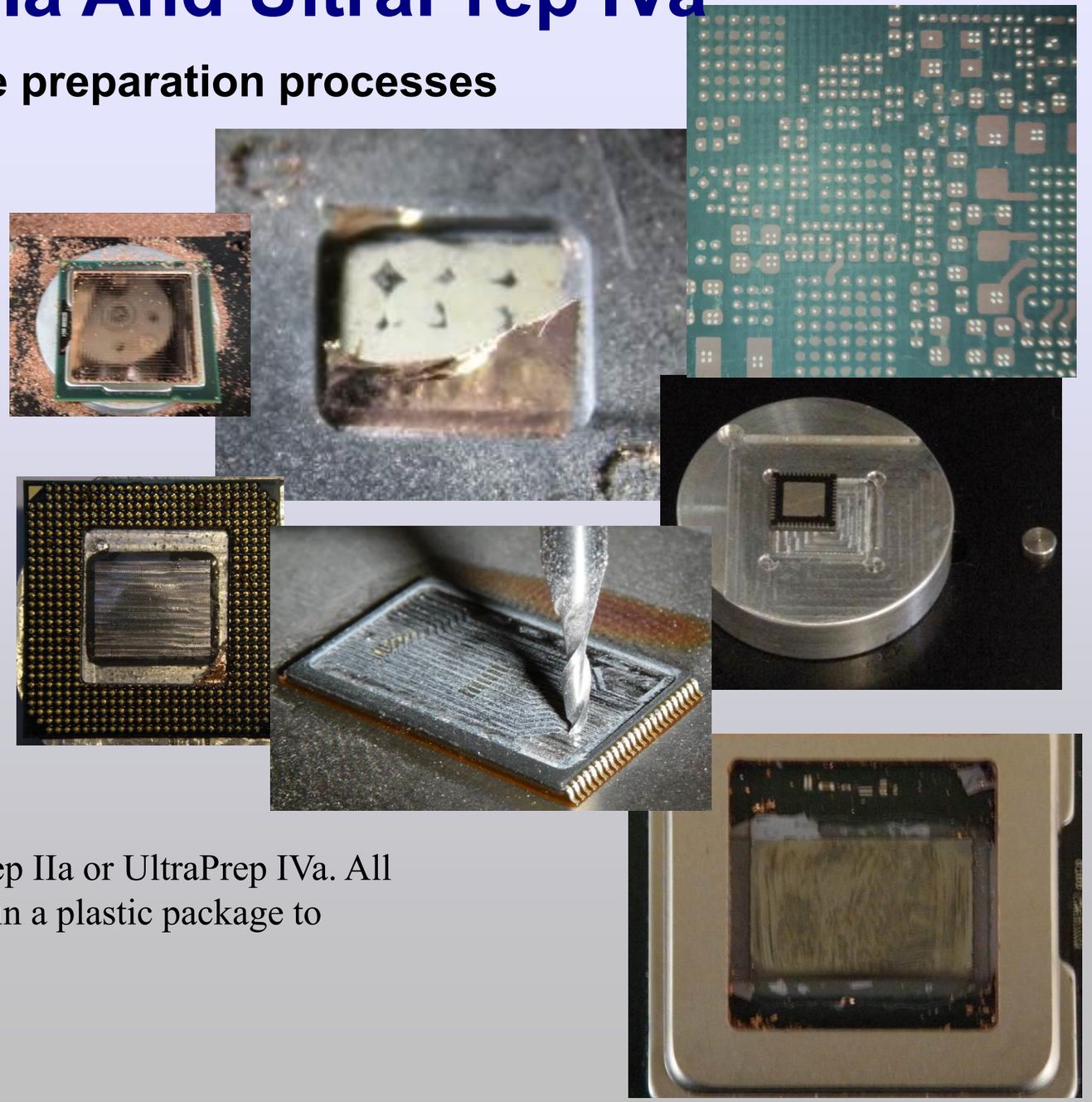
- “Push start and go to lunch” operation
- No “baby sitting” required unless operator end point detection is required
- 20,000 RPM spindle reducing process time by nearly 50%
- Recipes can be saved for later use
- All process and measurement data is saved and reported
- Simple sample mounting and alignment
- Fast, easy set up - Including video alignment
- Four point die alignment is available to eliminate rotational errors
- A wide range of machining, milling, lapping, and polishing processes for non-die thinning sample preparation needs
- Simple operator interface with full process programmability
- System automation of die thinning and polishing processes
- Programmable depth accurate to +/- 1 micron
- Removable sample holders – allows removal without re-mounting or aligning
- Contour tool path for all processes
- No leveling required during mounting or on the machine
- Little final thickness variation on thinned die < 2.0 microns at 50-micron remaining silicon thickness and <0.5 at 1 micron RST
- Manual input of measured sample thickness for precise thickness control
- Easy removal of heat spreaders, encapsulant, and die attach pads using the wide range of general machining proesses
- Available and inexpensive tooling
- Small footprint – takes little bench space
- Near zero down force during die thinning

The OmegaPrep IIa And UltraPrep IVa

Mechanical sample preparation processes

Often, there are mechanical processes needed to prepare a sample.

- Encapsulant and die attach removal
- Heat sink removal
- Substrate delayering
- Substrate removal
- Stacked die removal
- C4 ball exposure
- BGA removal from assembled PCBs
- Make special fixtures
- Machine stiffeners
- Open or remove RFI shields
- PCB and substrate editing



All of these processes are easily accomplished using the OmegaPrep IIa or UltraPrep IVa. All processes are selectable from the main menu, from exposing a die in a plastic package to creating a custom fixture for a difficult sample.

The OmegaPrep IIa And UltraPrep IVa

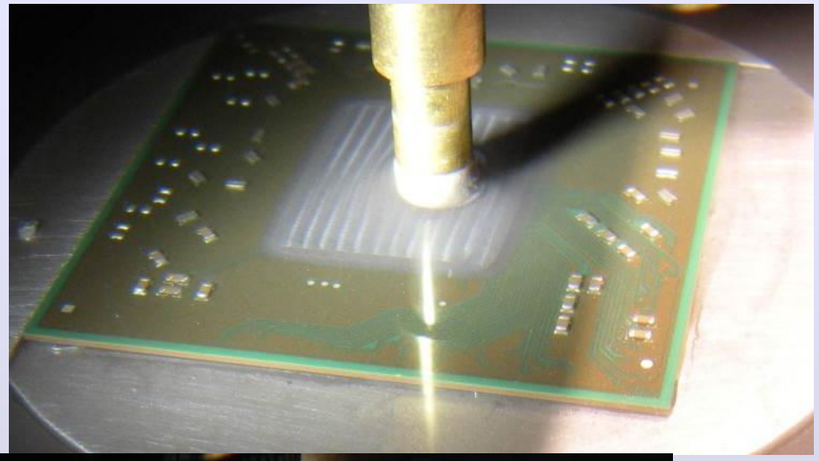
Die thinning processes

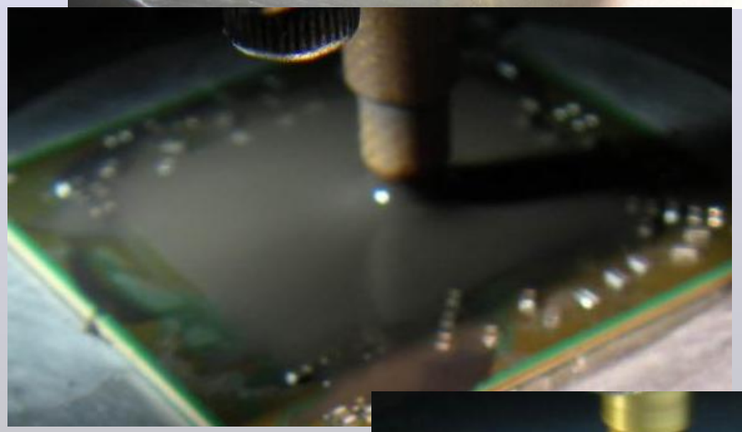
After the die is exposed, the die can be thinned.

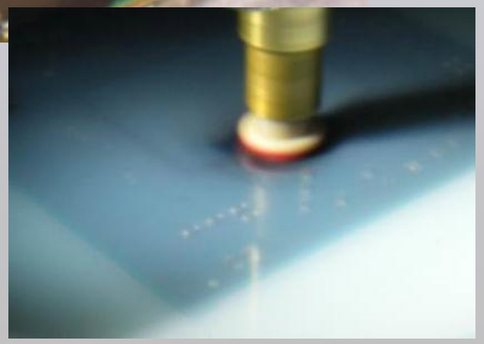
- Gross thinning with a diamond grinding tool
- Low force gross thinning with coarse diamond lapping film
- Coarse lapping with diamond lapping film
- coarse lapping with small diameter consumable tools
- Lapping with fine diamond lapping film
- Lapping with diamond slurries
- Polishing with fine diamond slurries
- final polishing with colloidal silica

All of these processes are easily accomplished using the OmegaPrep IIa or UltraPrep IVa. All processes are selectable from the main menu, from gross silicon removal using a grinding tool to final polish using a polishing pad and colloidal silica.

A wide selection of tools and abrasives are available for every process step. Small die are processed using consumable tools and slurries. Larger die are processed with either diamond lapping films, or a cloth pad and slurries.



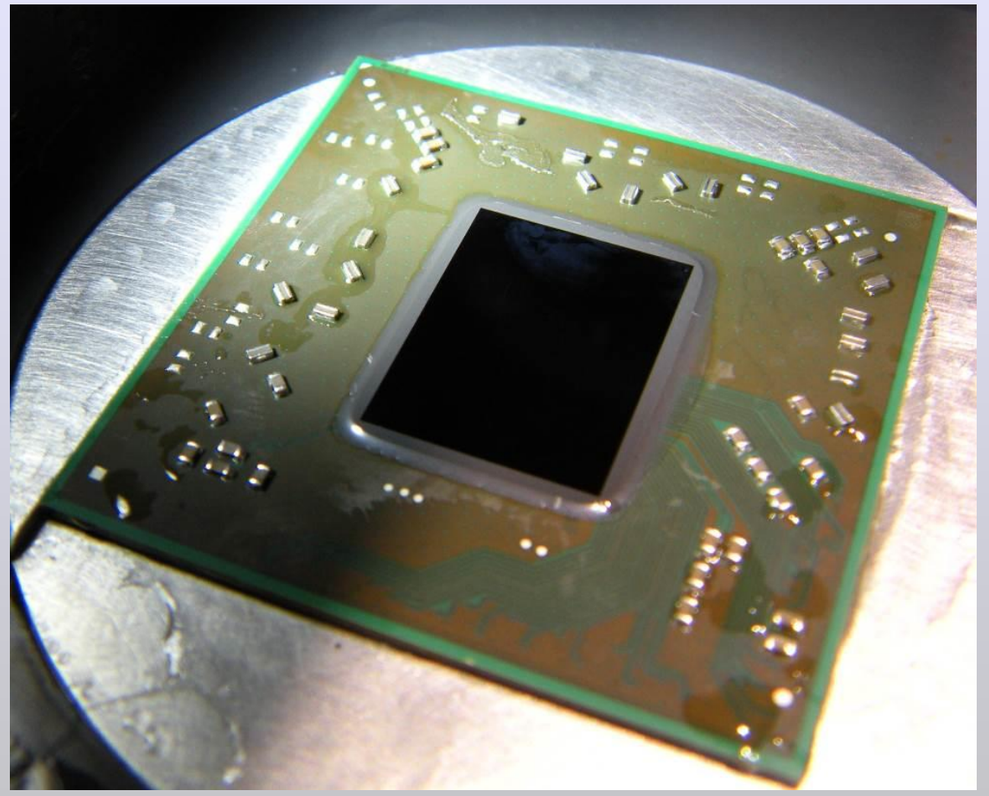


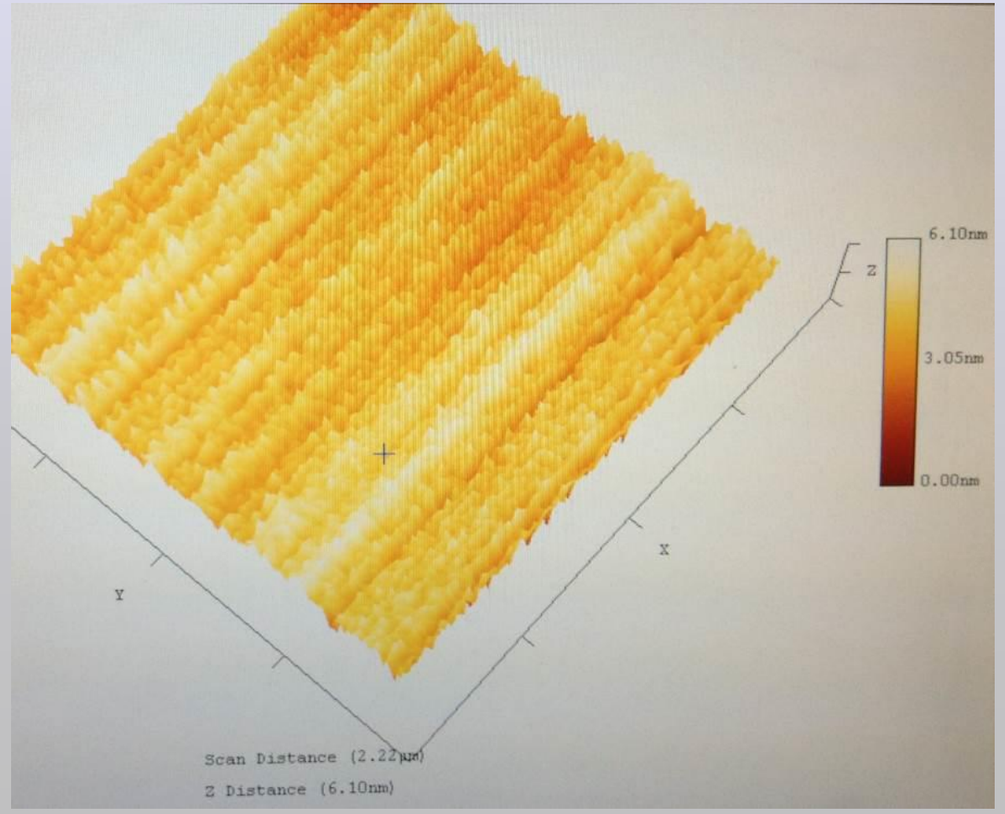


The OmegaPrep IIa And UltraPrep IVa

Die thinning - the best surface quality and lowest thickness variation

The resulting surface has a mirror finish with less than 8nm total surface variation as measured by AFM scans. There is minimal large area surface variation and thickness variation of ± 2 µ or less.





The result is a sample suitable for any additional F/A processing. The high quality surface allows easy SIL imaging and the uniform thickness speeds FIB processing.

The OmegaPrep IIa And UltraPrep IVa

Remaining silicon thickness control

The first step in remaining thickness control is to measure the profile of the die surface. No die is flat after being packaged. Different materials with different thermal expansion characteristics are used in the packaging. The simplest system is a ‘flip chip’ where the IC is soldered directly to the package substrate. Both components are heated to the melting point of the solder balls on the chip. The solder flows, electrically connecting the die to the substrate. As both are cooled, the solder solidifies mechanically joining the die to the substrate. As the thermal expansions of the die and substrate are different, when cooled to room temperature, each component contracts at a different rate. As the two are mechanically joined, the difference in thermal contraction creates stresses that cause both parts to curve. This is just like the bi-metal thermostat that controls heating/cooling system in most houses. Some claim that a die can be flattened by heating the substrate. If the substrate and die are at the same temperature, they will always be curved up to the temperature where the solder melts. If they are not at the same temperature, it may be possible to flatten the die. The temperature gradient required is not well defined and can not easily be controlled. As the die is thinned, the curvature caused by the stresses will change requiring a different thermal gradient to keep the die flat. Using a lubricant or slurry during the process complicates this as the gradient is determined by the heat flow through the substrate and the heat loss from the die’s exposed surface. A slurry or lubricant will change the heat loss from the die surface and the amount of heat that needs to be lost is a function of the thickness of the remaining silicon. It can be done, but there are a lot of variables to control.

The most reliable and reproducible solution is to measure the surface profile and move the tool bit so as to replicate the profile. The die/substrate still change shape during processing, but correcting for the changes is much easier than controlling a very dynamic thermal gradient from a constant heat source through a die that is changing in thickness and a slurry that changes in composition and emissivity. The RKD Systems sample preparation systems are designed to be run by an operator, not an engineer with a PhD.

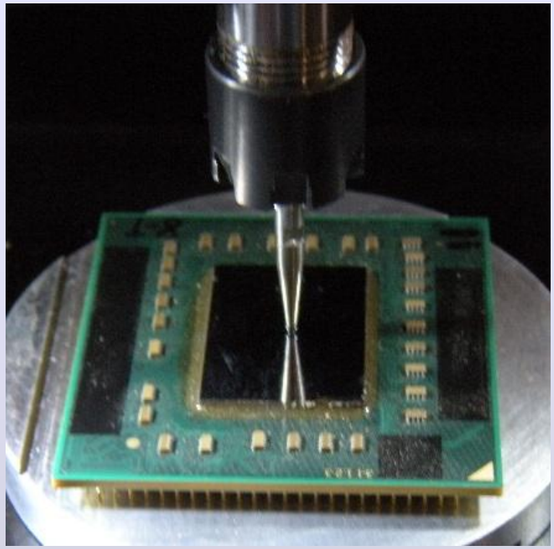
The first step in the thinning process, after alignment of the die corners, is to measure the die surface profile.

The OmegaPrep IIa And UltraPrep IVa

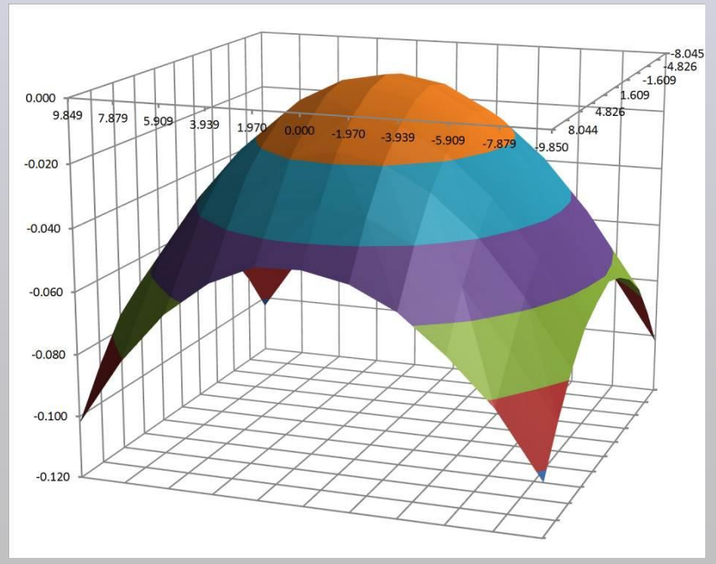
Remaining silicon thickness control - continued



The first step is to define the position of the die corners. This informs the system of the actual die size, rotation, and relationship to the machine's reference points. For die that are mounted parallel to the package edges, this could only require aligning two opposite corners. For die that are rotated as referenced to the package, a four corner alignment can be selected to provide precise die size, location, and rotation.



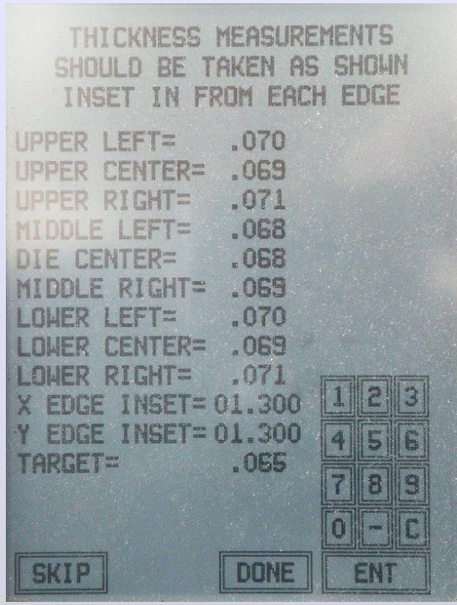
The system will then measure some number of points on the die surface. The number of points and their locations are determined by the system. A 35 mm X 35 mm die will have a lot of measurements, typically 361. A 5 mm X 5 mm die will only require 9 surface measurements and a 2 mm X 2 mm die will only need 4.



The surface height measurements are taken and converted into a wire frame representation of the die surface. The cardinal points of the wire frame are shown to the operator for review. Although there are no mechanical corrections for mounting slope and the systems will compensate for mounting deviations, there are second order effects of the mean slope of the die surface. Proper mounting should produce a mean surface slope of only a few microns per millimeter. A 15 mm X 15 mm die, if mounted carefully, will have less than 15 microns height difference between opposite edges. More than this can make getting a uniform silicon thickness more difficult. A little attention to early details can make later processes much easier.

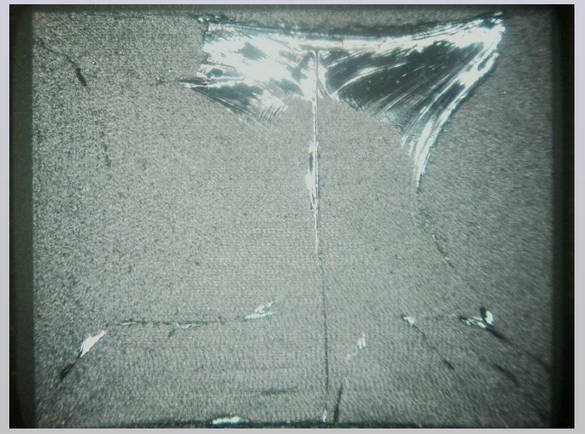
The OmegaPrep IIa And UltraPrep IVa

Remaining silicon thickness control - continued



After gross removal of silicon with either coarse lapping film or a diamond grinding tool, the die surface is cleaned up with a medium lapping film or slurry. The surface will then allow optical measurements of remaining silicon thickness. The thickness is measured in a 5 or 9 point pattern at a specified distance from the die edges. The measured thickness values are entered and are used to adjust the next process's measured surface profile.

Measurements are taken between each step and used to adjust the next one. This continues through the steps producing a die with very consistent thickness. A typical target thickness of 50 microns can be reached with +/- 2 microns total variation without significant operator intervention. If one step does not remove near the desired amount of silicon, it may have to be repeated. If a step removed more than desired, remaining steps will need their removal targets changed. This is all easy and done between process steps, not on the fly as with other systems.



The process, with little modification, can produce the desired results every time. A novel sample may take some minor process development, but the basic recipe is the same and all of the results will be the same.

Some samples have been encountered where the packaging stresses are very high. Attempting to use a grinding tool for gross thinning can result in fracture of the die. A gross thinning process is available that used a coarse diamond lapping film, eliminating die fracture resulting from high internal stresses and processing forces.

The UltraPrep IVa and OmegaPrep IIa available processes

There are twenty different processes built into the Prep systems. They are formed into three groups.

Whole die thinning

The first group is used for full die thinning and polishing. It is assumed that a sample requiring die thinning will be subject to all of the seven process steps in sequence. This means that in all steps the die size and physical position on the system will be the same for all steps and need to entered, and that the alignment of the die to the system only need to be done completely once. Between each thinning step, the die, fixture, and process cup will need to be cleaned to remove all abrasive particles and swarf. This requires removing the sample from the system and, after cleaning, replacing it on the system. The center point of the sample holder remains constant, but there may some slight variation in the rotation. Usually, the ALWAYS ALIGN DIE option is selected and the alignment of the first corner is adjusted by only rotating the holder. Once the first corner is aligned and the holder locked in place, alignment is terminated.

The first step in whole die thinning is the gross reduction in the die thickness using a diamond grinding tool. This is a fast way to remove a lot of silicon, but there are two problems, the resulting surface roughness, and the damage depth in the die resulting from the process. The damage depth problem cannot be ignored for this, or any thinning step. The mechanical damage extends from the surface for a depth of about the diameter of the abrasive being used. Accordingly, if the damage depth is close to the remaining thickness, the sample will be destroyed. Each thinning step must leave the remaining silicon thickness greater than the desired end point thickness plus the abrasive size. So, for a desired final thickness of 50 microns and a grinding tool with 80-micron grit size, the step should not leave any less than 130 microns. As there are tolerances relating to the starting thickness, the tolerance should be added as well. If the die starts off at native thickness of 770+/-10 microns, then the maximum removal should be 640 microns.

Usually, the surface is too rough to make any optical thickness measurements. This requires the second step which will smooth the surface enough to get reliable optical thickness measurements. This step, coarse lap 1, is done with relatively coarse, 45-micron, lapping film or a 30-micron slurry and removes enough material, typically about 40 microns, to remove the broken-up surface left by the grinding tool. This step does not require a full surface profile, so, typically, only a 9-point. Leveling, profile is done. This is much faster, and allows for any average plane rotation generated by particulate on the stage or bottom of the part holder.

The UltraPrep IVa and OmegaPrep IIa available processes - continued

The result of the coarse lap 1 is a sample that will allow optical thickness measurements and has a thickness of about 90 microns. The surface profile is consistent with the original before grinding, but the thickness will not be consistent due to the profile changes generated by the redistribution of the mounting forces. As the die is thinned, the shape of the front side changes as the forces change, but the back surface is machined to the measured profile. To get uniform thickness, thickness measurements must be made before any further thinning.

After coarse lap 1, and cleaning, thickness measurements are either made and entered by the optional measurement system, or some other instrument and the values entered into the Prep system. A full surface profile will need to be done and will be corrected by the thickness values to create the tool path for the next step, coarse lap 2.

Coarse lap 2 is usually done with 30-, or 20-micron film or slurry and will have a target thickness of about 61 microns. The Prep system calculates how much, and where, silicon needs to be removed to get to the uniform target thickness, but this can only be an approximation as the die front side and the substrate are still changing in shape due to the redistribution of the packaging forces and the slow, cold flow of the wax used to attach the sample to the holder. As silicon is removed, the die-substrate system will reduce in curvature. This change is resisted by the mounting wax. The wax will cold flow slowly allowing the sample to change in shape, or the sample could be heated to near the flow point of the wax to speed up the change. As the redistribution of force is a function of the before and after ratio if the die thickness, most occurs from grinding and coarse lap1. Annealing the sample and holder after coarse lap 1 and before thickness measurements are made will significantly reduce any profile changes in all following processes. The first two steps reduce the thickness to 12% of the original thickness.

The UltraPrep IVa and OmegaPrep IIa available processes - continued

The next step, fine lap, uses 9-micron film or slurry and doesn't remove material very fast so it has a target thickness of 55 microns. Prior to removing silicon, both a full surface profile and thickness measurements are made.

The next two steps are coarse and fine polish. These make fine adjustments in profile and thickness. Coarse polish usually is done with a hard polishing pad with 3-micron slurry. The target thickness is 51.5 microns. Fine polish also uses a hard pad but uses 1-micron slurry and a target thickness of 50.5 microns. It is possible to skip the surface profiling entirely prior to fine lap to prevent any damage to the polished surface.

The final step, final polish, uses a soft polishing pad with colloidal silica. It does not remove much material but creates a specular surface. Profiling can also be skipped for final polish.

The full process will produce a sample with a perfect, specular, surface and with overall thickness variation of +/- 5% of the target of 50 microns.

The UltraPrep IVa and OmegaPrep IIa available processes - continued

Machining processes

All of the processes in this group are all independent. Selecting one of these processes will bring up the last recipe run on the selected process and all parameters can be programmed without restrictions other than pattern size and machine travel.

Modify a fixture

This process allows machining a rectangular feature into a standard holding fixture. The feature can not alter the fiducial edges of the holding fixture. The corners of the rectangular area are drilled to eliminate the radiused corners from simply machining a rectangle. The pattern depth is limited to 1.000 mm.
This process allows making sample holders that are specific to a given package size and is usually used only for very small samples.

Mill a rectangle

This a general process that replaces the old ‘remove a heatsink’, and ‘expose a die’. The process will machine a rectangle into the sample to a depth of up to 1.00 mm. It has an option for cutting only at the perimeter and programmable over-travel. That is, the tool can be programmed to move beyond the edges of the programmed rectangle. If only party of the area to machined is free of ejector marks or edge radii can be processed by profiling the area clear of ejector pockets or edge radii and extending the tool travel over the entire area with the over-travel. The material being machined is selected from a list and the speeds and feeds are tailored to the tool diameter and the material being machined. There also options to finish the process manually, with the operator determining the end point. There is also an option to make the machined surface flat, instead of replicating the originally measured surface profile.
This is intended for use in removing heat sinks or spreaders, encapsulation over-burden, exposing the C4 balls by milling through the flip chip substrate, opening shields on PCB assemblies, and many other operations that can be done with an end mill.

Mill a slot

This process cuts a slot from a specified start point and end point. The slot is a trench the width of the end mill and the specified tool center start and end points. It can also have manual end point determination and the tool path can be either the measured surface profile of a straight line. Again, the available area that can be programmed is limited by the fixture fiducial edges and the travel limits of the system.
This can be used to cut through stiffeners, opening shields, and even cross sectioning of the sample. This, plus the mill a rectangle, provides the capability to use the system for any process that requires the use of an end mill.

Grind a rectangle

This the same operation as mill a rectangle, except using a grinding tool with the speeds and feeds selected by the selected material. The material list includes silicon and ceramic. Using this process usually requires the use of a lubricant and may work best by using the use of the Continuous Flow System. This system provides a continuous flow of lubricant and removes the swarf loaded lubricant from the process cup.

It has all of the same options as mill a rectangle including perimeter only, manual termination, a planar tool path, and over-travel.

Grind a slot

This to grind a rectangle as mill a slot is to mill a rectangle.

Lap a rectangle

This process allows lapping any of the specified materials with any available lapping/polishing tool, and any of the specified grits, from colloidal silica up to 125-micron diamond grinding film. The speeds and feeds are determined by the system based on the tool diameter, grit size, and material. The pattern rotation is selected by the operator and should be changed when changing the grit size. The over-travel is best set to the tool diameter, as this will make the as-lapped surface profile as close as possible to the measured surface profile.

This process can lap and polish any of the listed materials, but the speeds and feeds are optimized for silicon only. The range of hardness of other materials varies widely and the speeds and feeds are set for the middle of the hardness range. Lapping a piece of 99.8% alumina hard ceramic will take longer that lapping a glass binder ceramic. The range of hardness of ferritic materials is equally as great. A soft stainless, such as 303l, will lap much faster that 420 alloy.

\With some materials, copper and aluminum, certain alloys will adhere to lapping film, making the process very difficult.

Possible problems solved

Remove a ball grid array part from a PCB for replacement

This is really easy. Select grind a rectangle, and a carbide burr as the tool. Set the over-travel as high as possible without letting the burr touching surrounding components. Set the depth to the thickness of the part and use manual finish so that the operator can adjust the depth for the best residual solder balls.

The UltraPrep IVa and OmegaPrep IIa available processes - continued

Remove the soldered cover from an EM shield on a PCB assembly

Use the machine a rectangle in the edge only mode. Using the four-point alignment to select the corners of the shield and set the over-travel to ½ of the tool diameter. With the depth set to more that the shield material thickness. Press run and the lid will be removed.

If the shield is not a rectangle, it can be removed by using the machine a slot process and select the vertices of the shield one by one. It will be a lot faster that it appears as each segment takes only a few seconds. The edges do not need to be aligned to a principal axis as the slot is a line between two points.

Remove the window from an image sensor

Use the grind a rectangle in edge only mode. Grind the glass as close as possible to the inside of the bonding and remove the window suing a vacuum pickup tool. There are manual adjustments so that the operator can bring the ground surface right up to the inside edge of the cavity. This should be done with a lubricant but if a very small part of the bonded area, no lubricant will get to the inside. Using a vacuum pickup tool will remove the window with little particulate contamination of the sensor.

Delayer a PCB

This is best done with the lap a rectangle process and 75- or 45-micron lapping film. As the thickness of each layer is unknown, manual thickness control can be used for the entire process. To do this, select manual termination and set the thickness to 0.000.

Cut a buried trace on a PCB

Use the machine a slot process with manual depth control. Set both the start and end points to the same place on the PCB. While the process is running, move the depth to the desired layer.

Cross section a flip chip

Using a small diameter grinding tool for grinding a slot. Set the start and end points to the substrate edges on the desired sectioning line. Set the depth to the measured sample thickness and the material to silicon. Then press run. This needs to be done with lubrication.

Almost anything else

The ability to mill, grind, lap, and polish gives an exceptionally wide range of possible uses. If one has a problem that can be solved by removing material with any of the available le processes, these are the systems to use. They are not limited to the precise thinning of a silicon die, but can perform many other machining processes to solve F.A. problems.

Specifications - continued

	OmegaPrep IIa	UltraPrep IVa
Axis mechanical resolution and repeatability		
X and Y axis Resolution	0.000496 mm	0.000496 mm
Z axis resolution	0.000248 mm	0.000248 mm
X and Y axis repeatability	+/- 0.001 mm in same direction	
X, Y axis overall repeatability	+/- 0.002 mm at constant temperature	
Z axis repeatability	+/- 0.00025 mm in same direction of movement	+/- 0.00025 mm in same direction of movement
Z axis overall repeatability	+/- 0.0005 mm at constant temperature	+/- 0.0005 mm at constant temperature
Scale resolution and accuracy		
Resolution	0.000244 mm	
Scale accuracy	+/- 0.040 mm/meter	
Hysteresis	< 0.002 mm (uncorrected)	
Geometry		
X to Y axis	+/- 0.50 mrad maximum	
Z to X-Y plane	+/- 0.50 mrad maximum	
spindle axis to X-Y plane	+/- 0.25 mrad typical	
Spindle run out	0.003 mm maximum	
Spindle collet type	ER-8 0.125 inch supplied	
Spindle speed	20,000 RPM max	
Surface measurement repeatability	0.0015 mm maximum 3 sigma over 25 repeated measurements	
Surface measurement contact force	50 grams typical	

The OmegaPrep IIa And UltraPrep IVa

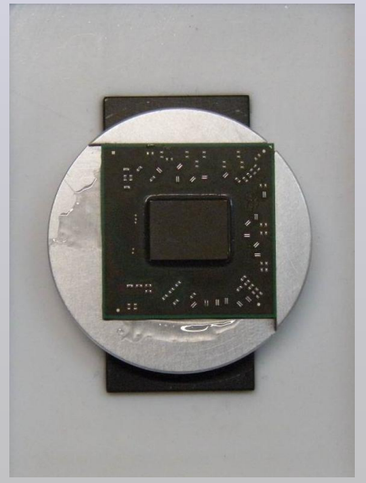
Options, tools, and accessories

The MountPlate IIa



The RKD Systems Model 2200 MountPlate IIa is a specially designed hot plate used for wax mounting of integrated circuit packages in preparation for back side thinning and polishing or mechanical decapsulation. The unit heats the sample holding fixture up at a controlled rate to prevent thermal damage or the establishment of thermal induced mechanical stress in the sample being mounted. When the programmed temperature is reached, the operator is prompted to mount and align the sample. When this is done, the MountPlate will cool the sample and holding fixture at a controlled rate setting the mounting wax. When the sample is cooled to the resting temperature, the operator is prompted to remove the mounted device and holder.





Specifications

Temperature program range	60 to 150 degrees C.
Heating ramp rate	Programmable from 0.1 to 1.0 degrees per second
Cooling ramp rate	Programmable from 0.1 to 1.0 degrees per second
Soak time	Programmable from 1 to 60 seconds
Rest temperature	36 degrees C nominal
Temperature accuracy	+/- 1.0 degrees C
Weight	10 pounds (4.6 Kg)
Size	5.5 inches high X 6.5 inches deep X 11 inches wide (140mm X 165 mm X 180 mm)

The OmegaPrep IIa And UltraPrep IVa

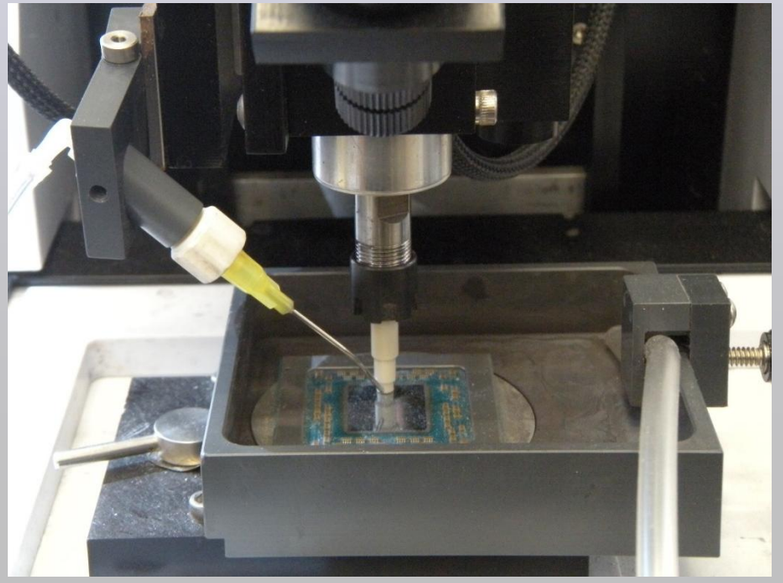
Options, tools, and accessories

The Model 2400 Flow System



The RKD Systems Model 2400 Continuous flow System is a small, compact, machine that provides a continuous flow of water or lubricant over a die surface during die thinning processes that utilize lapping films. Two pumps provide dispensing and scavenging of the lubricant. One pump dispenses clean lubricant from a source bottle while the scavenging pump extracts the liquid from the process cup and moves it to a waste bottle. Both bottles are contained by the system. Level detection is provided to detect a near empty source bottle or a nearly full waste bottle. The bottle housing provides secondary containment and leak detection. Both visual and audible indications are provided for bottle level conditions and leak detection.
The supplied waste extraction assembly clamps onto the process cup providing easy setup without modification of standard tooling. The dispensing assembly clamps onto the spindle carriage assembly of the UltraPrep IV or OmegaPrep, allows dispensing through a standard hypodermic needle, and allows precise adjustment of the point where the liquid is dispensed.

The continuous flow of lubricant over the die surface increases material removal rates, increases film lifetime, and reduces the tool force on the die. This is done by removing the silicon particles generated by the lapping process. Without a continuous flow of lubricant, the particles accumulate on the lapping film preventing full contact of the abrasive with the die surface reducing the removal rate. The controls are simple with a knob that controls dispensing rate and buttons to start or end dispensing, fill the dispense line, or drain the waste line.



Specifications

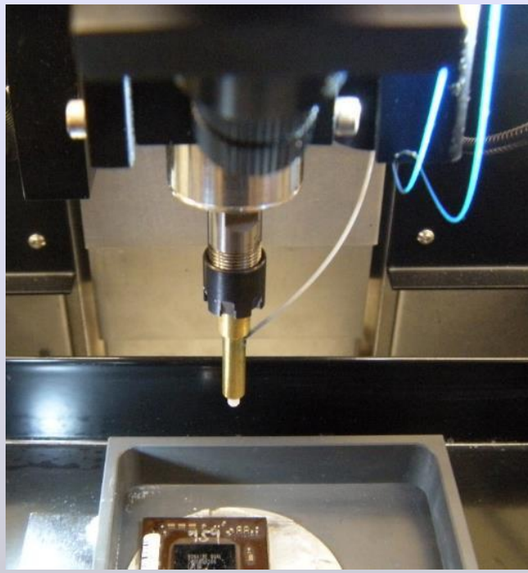
Machine size	
Width	225 mm (8.75 in.)
Height	155 mm (6 in.) without bottles 280 mm (11 in.) complete
Depth	200 mm (7.90 in.)
Weight	3 Kg (6.6 lb.) Maximum dry
Dispense flow range	0 to 40 ml/minute
Scavenge flow	100 ml/ minute
Bottle volume	1000 ml (32 ounces)

The OmegaPrep IIa And UltraPrep IVa

More options, tools, and accessories

Optional thickness measurement

Thickness measurement capability is available in two different ranges. The high range system has a measurement range of 20 to 300 microns and the low range system has a measurement range of 0.5 to 40 microns. Both systems are included in the option, each with its own optical probe.



The included software will measure precisely positioned points on the sample that can be easily correlated to the mechanical profiles. There is a special function in the software that will search for a place that will provide a good reading while still being close to the theoretical measurement point. This function duplicates the searching for a valid thickness reading that a good operator does when measuring sample thickness.

The entire measurement process runs automatically. Depending on the sample, the process can be slow, but it does not require any operator intervention. The operator is allowed to enter estimated values for points that are not measurable.

The OmegaPrep IIa And UltraPrep IVa

Options, tools, and accessories

Optional thickness measurement, continued

Specifications

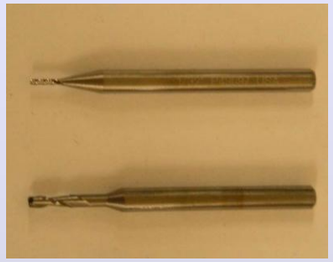
	High range	low range
Maximum measured thickness	~~300 microns~~	40.0 microns
Minimum measured thickness	20 microns	0.5 microns
Measurement accuracy	+/- 1% of reading +/- 1 micron	+/-2.5% of reading +/- 0.1 micron
Effective spot size	< 15 microns	< 220 microns
Wavelength range	1529 nm to 1567 nm	730 nm to 990 nm
Maximum sample surface slope	20 mrad (20 microns/mm)	20 mrad (20 microns/mm)
Maximum thickness variation	25 microns/mm	thickness > 30 microns – 3 microns/mm thickness 20-30 microns - 2 microns/mm thickness 5 to 20 microns – 1 micron/mm thickness < 5 microns – 0.1 microns./mm
Measurement time	5 seconds typical per location	4 seconds typical per location

The OmegaPrep IIa And UltraPrep IVa

More options, tools, and accessories



Consumable tools are used with slurry.



End mills are available in hundreds of sizes but RKD Systems only stock and supply two sizes.



The accessory kits include a wide range of tools and supplies.



Grinding and lapping tools are available in a wide range of diameters and shapes.

The OmegaPrep IIa And UltraPrep IVa

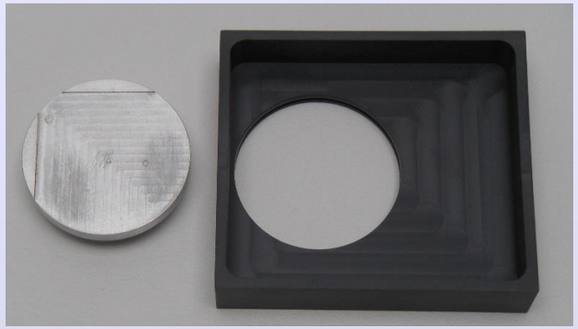
More options, tools, and accessories



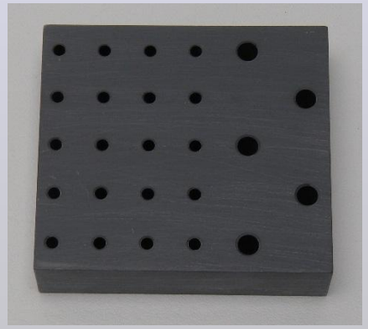
A tool setter is supplied to allow mounting tool bits properly.

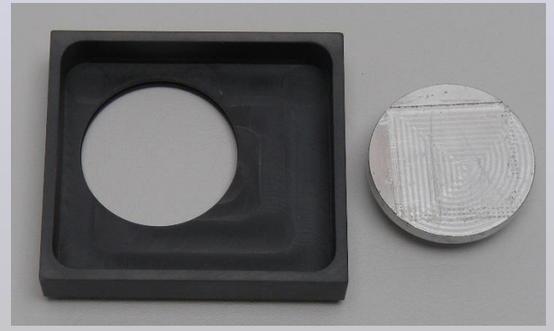


The touch tool is supplied with two different tips that screw into the shaft

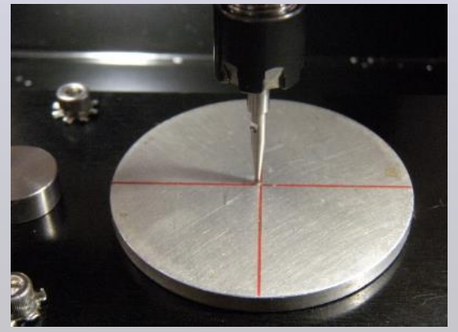


A large part holder and its process cup.





A 45 mm part holder and its process cup.



An alignment fixture is provided for aligning and setting machine and camera zero points.

The OmegaPrep and UltraPrep

We do not break die. Period.

- Some samples are ‘one of a kind’. The sample should not be damaged and data lost. We do our utmost to insure the survival of every sample without adding unknown artifacts, damaging the system, or endangering the operator.
- We can process samples to tight thickness tolerances by allowing the correction of the initial, measured surface profile for the actual measured remaining silicon thickness.
- With the optional thickness measurement system, area of interest thinning can be done to less than 4 microns.
- No curvature calculations, force feedback or other gimmicks. Four, five, or six axes are not required; only proper surface profile measurement and processing to the measured profile.
- The samples are processed to the initial measured profile that can be corrected for changes that occur during processing by either entering manual thickness measurements or using the optional thickness measurement system. Correction of the measured profile for stress re-distribution during thinning is mandatory for minimal thickness variation and can only be accomplished by multiple, spatially repeatable, thickness measurements.
- We can perform any mechanical process required to prepare a sample. Creating a holding fixture, heat sink removal, substrate delayering, substrate removal, removal of stacked die, C4 ball exposure, even die delayering. We can even remove devices from PCB assemblies.
- New problems often require new techniques and processes. RKD is the only company that continues to support all of its customers with new software, new techniques, and new processes as they are developed.
- RKD can provide custom fixtures for unusual devices, packages, and problems. We provide all aspects of customer support; custom fixtures, software upgrades, process development, and general problem solving.
- RKD Systems supports semiconductor failure analysis and related fields only. We do not polish gems, polish fiber optics, process metallographic samples, or sell microscopes.