From Eye to Insight

Leica
MICROSYSTEMS

EM TXP

Target surfacing system

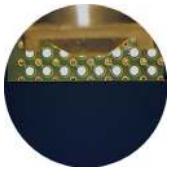


EM TXP –
TARGET SURFACING SYSTEM

The EM TXP is a unique target preparation device especially developed for cutting and polishing samples prior to examination by SEM, TEM and LM techniques. It excels with challenging specimens where pinpointing and preparing barely visible targets becomes easy. Before the EM TXP, sawing, milling, grinding and polishing exactly to the target was often a very time-consuming and difficult procedure as points of interest were easily missed and specimens often difficult to handle due to their small size. With the EM TXP such samples can easily be prepared. Furthermore, due to its versatility, the EM TXP is a very efficient tool for sample pre-preparation prior to ion beam milling and ultramicrotomy.



Leica Design by W. Höltbl



90° rotation view



Processing observation



Front face observation

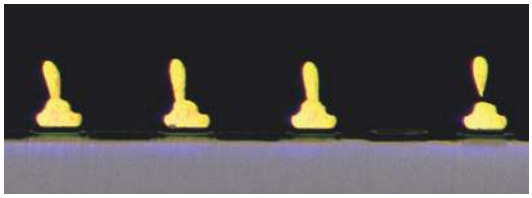
INTEGRATED VIEWING SYSTEM

Stereomicroscopic target observation during the working process

With the specimen pivot arm the sample can be observed during preparation at an angle between 0° and 60°, directly onto the front face, or 90° to the front face for distance determination with an eyepiece graticule. The EM TXP features brilliant ring LED top light and optimized backlight illumination for excellent viewing.

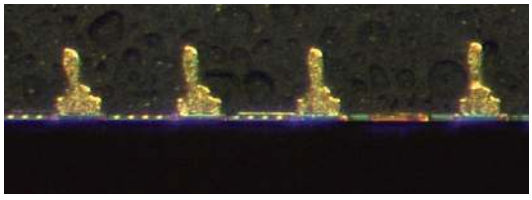
- **Accurate location and preparation of microtargets**
- **In-situ observation with a stereomicroscope**
- **Multifunctional machine processing**
- **Automatic process control to produce a mirror-like surface quality**
- **Brightness control and segment selection of LED-ring illumination**



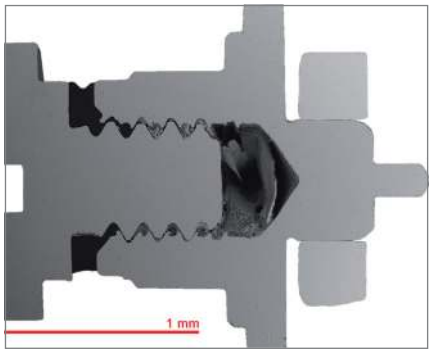


Viewing with full ring illumination

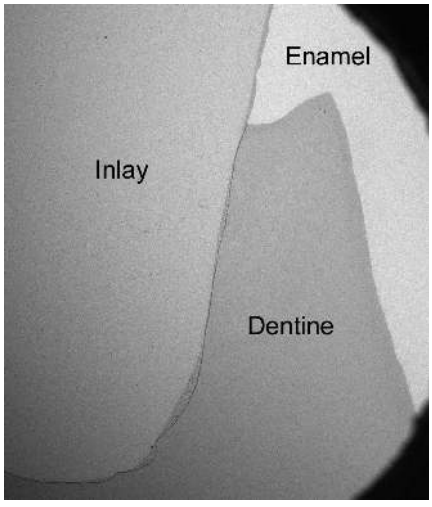




Viewing with quarter ring illumination



Top: Cross section of watch assembly (processed without embedding)
Right: Cross section of a tooth (processed without embedding)

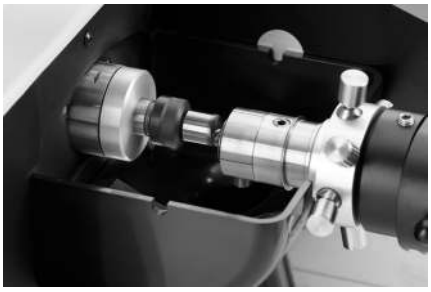


PROCESS POSSIBILITIES

Once the sample is clamped into the specimen holder and inserted in the pivot arm, the specimen can be:

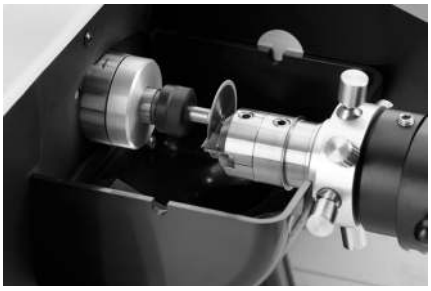
- milled
- sawn
- drilled
- ground
- and polished

without removing the sample from the EM TXP and simply changing the tools while observing the process directly through the stereomicroscope. The tool and sample are enclosed within a protective chamber with a transparent cover for safety. This prevents access to moving parts and avoids particulate matter escaping. During milling a low-noise extraction and filtration unit with a Hepa filter (optional) provides a safe, dust-free environment.





Diamond and tungsten carbide millers



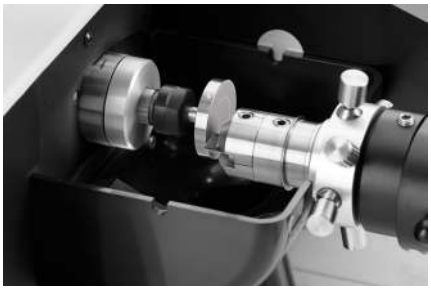


Diamond disc cutter





Diamond core drill





Lapping foil inserts

INTEGRATED AUTOMATIC PROCESS CONTROL

Let the EM TXP do the job
The EM TXP automatic process control mechanism saves you from time-consuming routine sample preparation:

- **with the automatic E-W guiding mechanism**
- **with the force-regulated feed control**
- **with the distance or time countdown function**
- **with force-controlled auto-advance for core-drilling**

and level sensor for the integrated lubricant cooling system



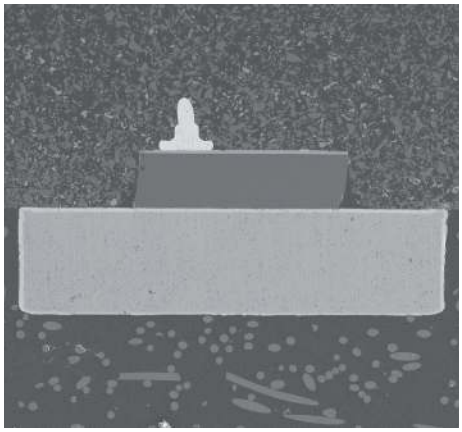
Peristaltic cooling system

E-W guiding mechanism
(manual or automatic)

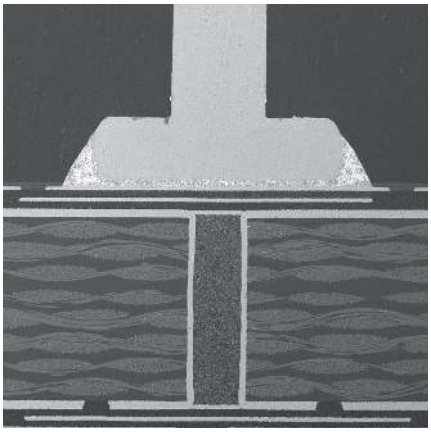
– Pivot arm lever
– Hand wheel for manual feed in steps of 0.5, 1, 10 and 100 µm
– Control panel for manual operation and setting of all parameters for automatic preparation



SM LED gold wire bond

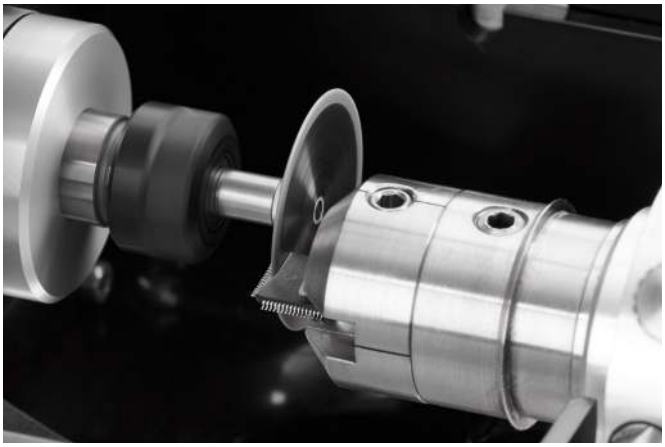


PCB cross section with soldered pin



Target preparation on surfaced sample for incident light LM and SEM

All processing steps are carried out consecutively on the EM TXP without removing the sample for pinpointing the area of interest via another microscope or for making any adjustments. Preparing specimens observed during operation with the integrated stereomicroscope avoids the time consuming interruption of locating the target with a stand alone microscope and then re-aligning the sample in the polishing instrument.



Sawing

Sample thinning for transmitted light LM or prior to ion thinning for TEM

Specimen thinning with the EM TXP offers the advantage of observing the complete process during treatment and distance monitoring at each process step without the need to remove the sample for checking in another instrument.

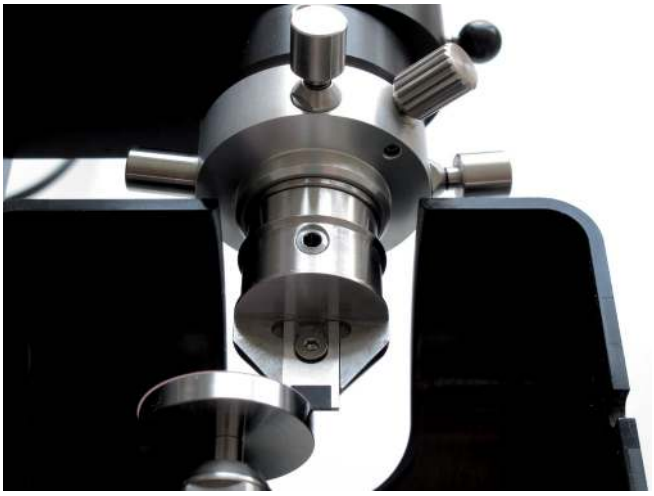




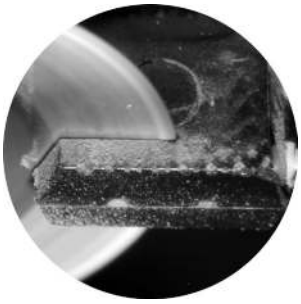
After the sample is fixed onto the stub a 3 mm disc is cut out using the core-drill in conjunction with the force-regulated auto-advance. The first side is then finished using the grinding and polishing foils.

The EM TXP is a unique target surfacing system developed for cutting and polis

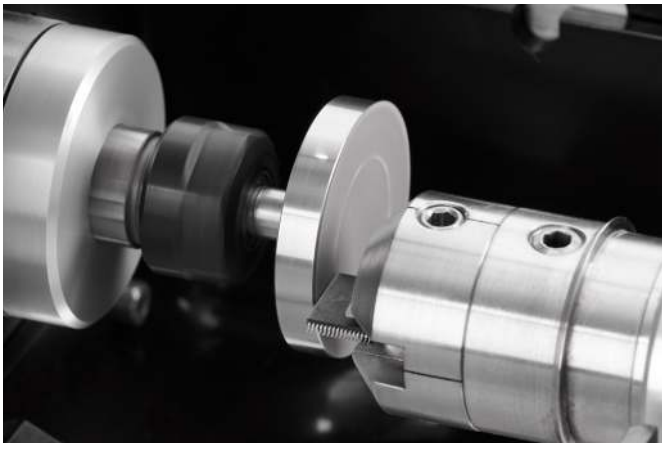
Alignment of sample details can be rapidly performed using the alignment accessory. Thus, the EM TXP is the instrument of choice for pre-preparation of the sample prior to ion beam slope cutting with e.g. the EM TIC 3X.



Sample holder attached on the alignment accessory. The micro-targets can be aligned during the process while observing with the stereo microscope.



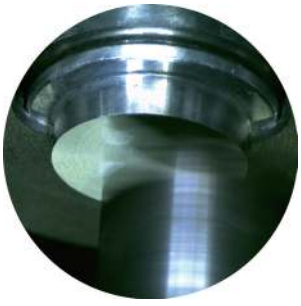
Observation via stereo microscope of the EM TXP



Grinding / polishing



The area of intere



The surface of the stub is milled with the tungsten carbide miller so it is parallel to the grinding and the polishing plane for processing the second side of the sample.

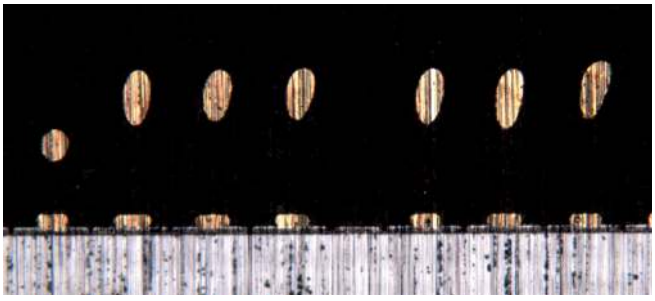


The prepared first side is fixed onto the surface of the stub. The second side is then cut, ground and polished. The thickness of the sample can be determined with the advance counter display.



In such a manner, subsequently prep EM RES102.

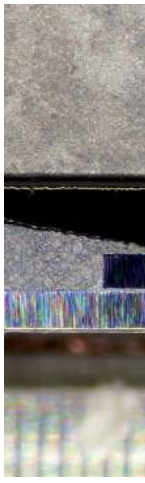
shing samples



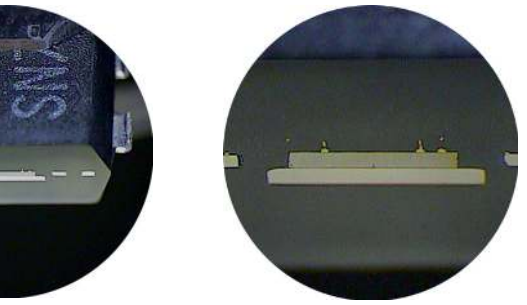
Within a few minutes all sample details are aligned. LM-image of gold wire bondings processed with the cut-off wheel and ground with 6 µm diamond foil during alignment. The surface finish is good enough for subsequent finishing with the ion beam slope cutter, EM TIC 3X.



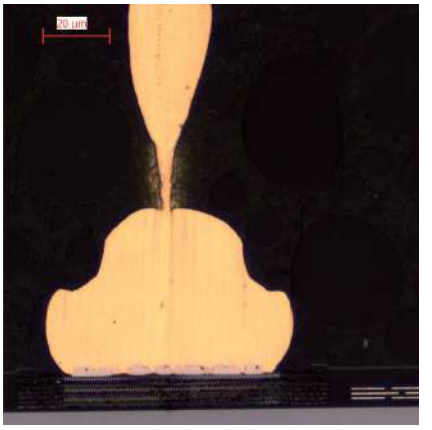
The EM TIC 3X features three ion guns in one assembly enabling >4 mm cutting width and >1 mm cutting depth.



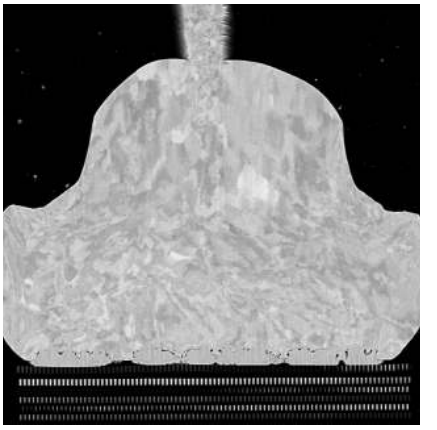
Gold-wire bonding dark area above t



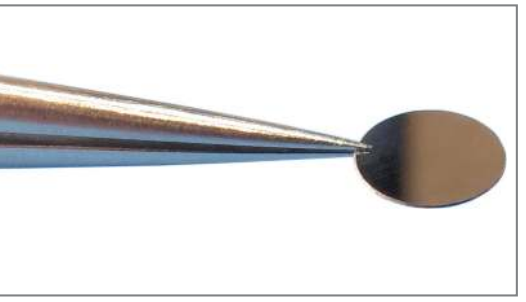
st via the stereomicroscope of the EM TXP



Gold-wire bonding of IC-package prepared with the EM TXP (LM image).



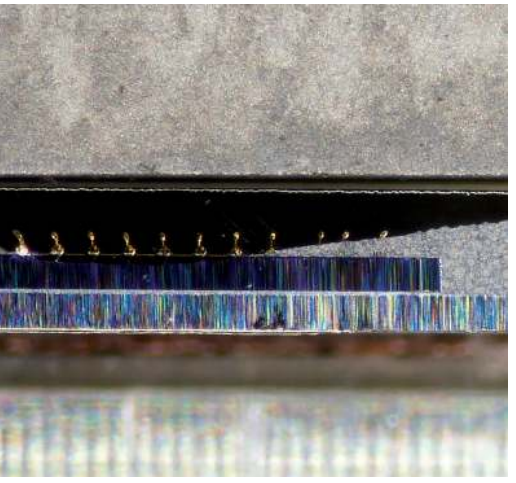
Same gold wire bonding subsequently processed for half an hour with the Leica EM RES102 (SEM image).



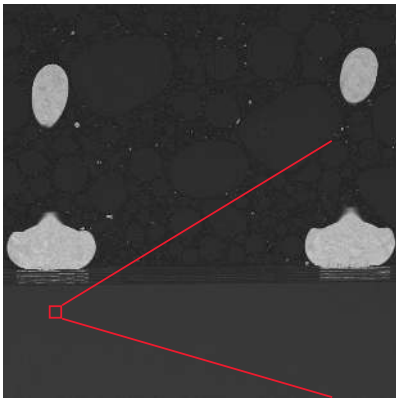
even hard and brittle materials can be thinned to be pared for TEM investigation e.g. for ion thinning with the

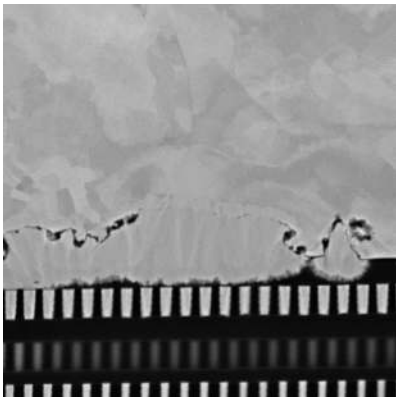


Left: EM RES102 for ion beam processing of TEM and SEM samples



gs of IC-package during processing with the EM TIC 3X. The he gold wires has already been polished by the ion beam.





High surface quality within a few hours. The user interaction time of the complete process is around 20 minutes using the EM TXP prior to EM TIC 3X.

VIEW THE DETAILS



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