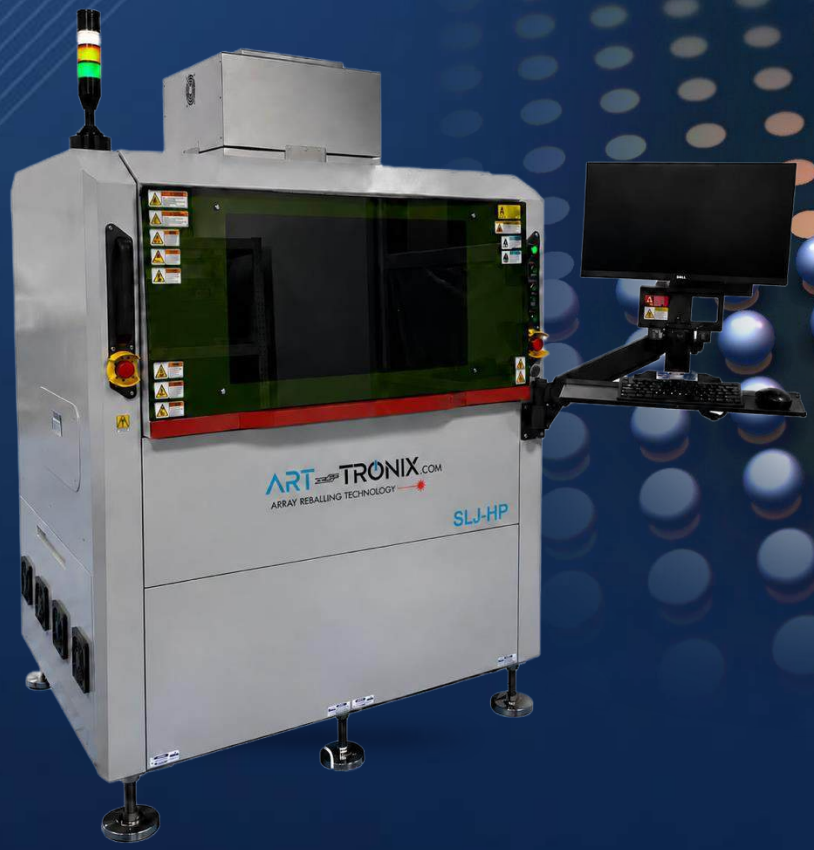
ARTTRONIX.COM
ARRAY REBALLING TECHNOLOGY

ADVANCED PACKAGING EQUIPMENT



Equipment for solder joints in semiconductor packages

ARTTRONIX.COM
ARRAY REBALLING TECHNOLOGY

ADVANCED PACKAGING EQUIPMENT

Our Solutions

Equipment for each step of the solder-joint process,



LSJ P.3-4-5

Solder Laser Jetting

Jets single solder balls, 40–760 µm



HS-JM P. 6-7

Solder Ball Attachment

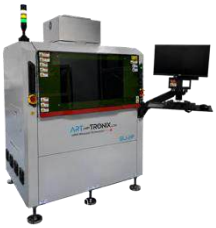
Screenless, 40–200 balls/s



HS-R P. 8-9

Solder Ball Rework

Inspects and repairs ball arrays



LCB P.10

Laser Compression Bonding

Die held and pressed while the laser bonds it



LAB P. 11

Laser Assisted Bonding

Laser reflow in 5–20 s, replacing the oven

PARTNER



Dr. Ghassem Azdasht

LASER R&D, BERLIN

Has worked on laser soldering and micro joining since 1986. Leads laser R&D for the group's equipment.

150+
INTERNATIONAL PATENTS

~30
MACHINES DEVELOPED

35+
YEARS IN LASER SOLDERING

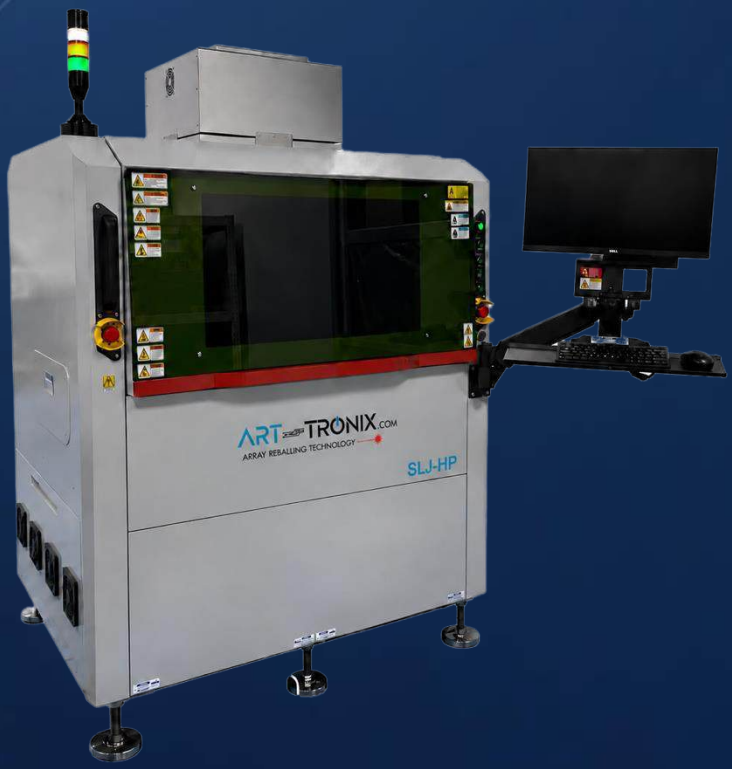
ADVANCED PACKAGING EQUIPMENT

SLJ SERIES

Non-Contact

Solder Laser Jetting

ART-Tronix's laser solder ball placement solution works with a wide range of solder alloys, including lead-free, high-lead and gold-tin (AuSn), with ball diameters from 40 to 760 µm, including ultra-fine-pitch applications. SLJ melts each solder ball with a laser and jets it out under nitrogen pressure, delivering high-accuracy placement and flexible soldering in a low-oxygen environment. No fixtures, no flux and no reflow are required. The low-pressure, contamination-free process is cost-effective, cleanroom-compatible and available with an ESD-safe option.



40 – 760
Solder Ball Diameter Φ (µm)

±5 µm
Max. Placement Accuracy

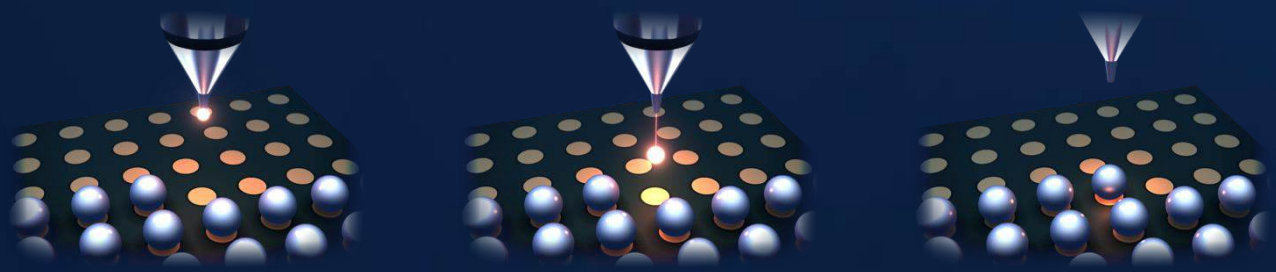
20 /s
Max. Balls per Second

65
Alloys Tested

Process Advantages

- No Fixtures
- No Flux
- No Reflow
- No Flux Cleaning
- Non-Contact Jetting
- Low Thermal Stress

How It Works



01 MELT
A laser melts a single solder ball inside the capillary.

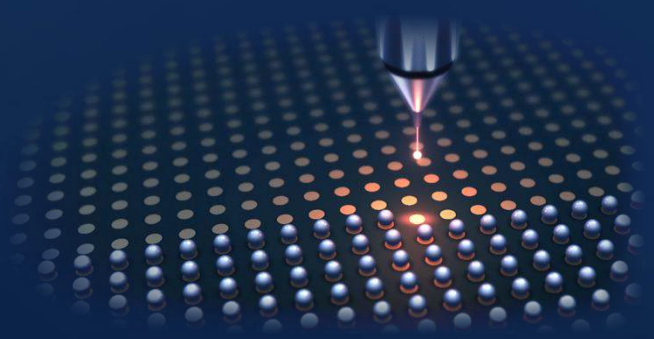
02 JET
Nitrogen pressure jets the molten ball onto the pad.

03 JOIN
The joint forms within milliseconds, fully contact-free.

SLJ · High-Precision Nozzle

SLJ-HP
High Precision

Equipped with a high-precision nozzle for solder balls below 250 µm, meeting the most demanding accuracy requirements



±5 µm

Placement Accuracy

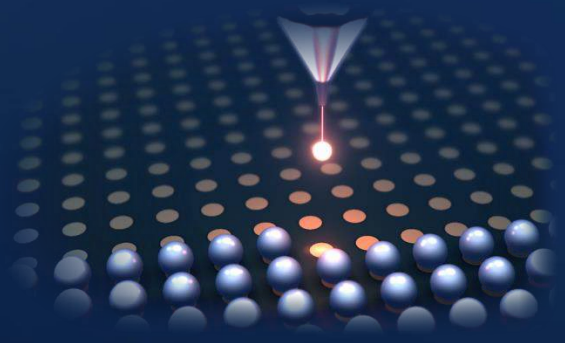
Specifications

Placement Accuracy	±5 µm
Ball Diameter Range	Min. Φ40 µm
Placement Speed	Up to 20 balls/s (depending on ball size and process parameters)
Max. Working Range	X 500 mm · Y 500 mm · Z 50 mm
Compatible Solder Alloys	SnAgCu, SnAg, SnPb, AuSn, InSn, SnBi, etc. · 65 alloys tested
Laser Options	50 W / 100 W / 200 W (optional, per requirement)
Motion System	Gantry · Renishaw linear encoder, 0.1 µm resolution
System Integration	Customisable automation for in-line volume production · ESD option available
Dimensions (L × W × H)	1350 × 1100 × 1950 mm
Machine Weight	approx. 1200 kg
Power Supply	240 VAC single-phase · max. 20 A · 50 / 60 Hz
Compressed Air	Min. 6 bar (87 psi) · ISO 8573-1 Class 1:2:1 · flow < 250 L/min
Nitrogen	N_2 5.0 (99.999%) · min. 2.5 bar (36 psi) · operating flow ≤ 1.0 L/min

SLJ · Standard Nozzle

SLJ-ST Standard

Equipped with a standard nozzle for solder balls of 250 µm and above



±15 µm

Placement Accuracy

Specifications

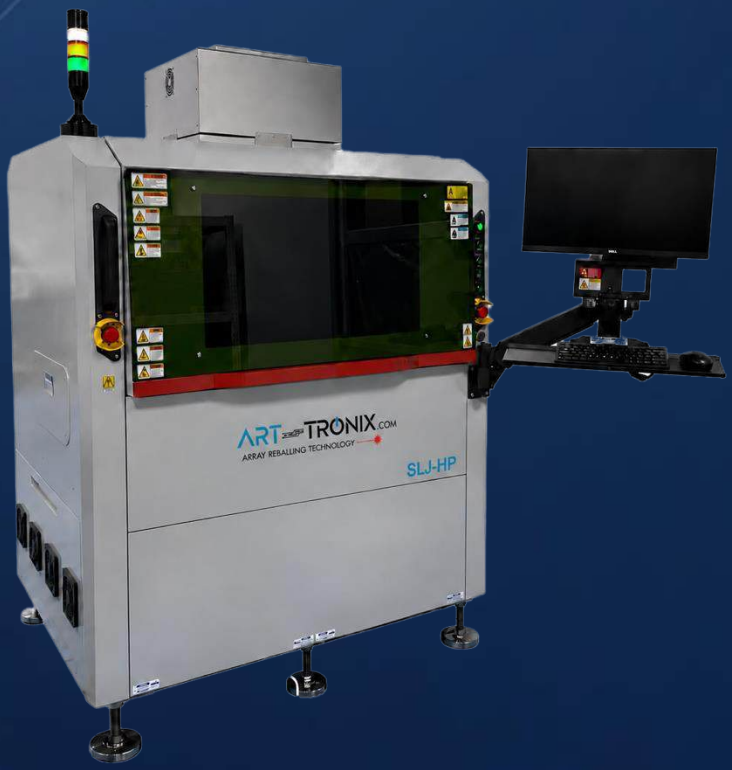
Placement Accuracy	±15 µm
Ball Diameter Range	Up to Φ760 µm (above 760 µm optional)
Placement Speed	Up to 20 balls/s (depending on ball size and process parameters)
Max. Working Range	X 500 mm · Y 500 mm · Z 50 mm
Compatible Solder Alloys	SnAgCu, SnAg, SnPb, AuSn, InSn, SnBi, etc. · 65 alloys tested
Laser Options	50 W / 100 W / 200 W (optional, per requirement)
Motion System	Linear System · Renishaw linear encoder, 0.5 µm resolution
System Integration	Customisable automation for in-line volume production · ESD option available
Dimensions (L × W × H)	1300 × 1300 × 2050 mm
Machine Weight	approx. 1200 kg
Power Supply	240 VAC single-phase · max. 20 A · 50 / 60 Hz
Compressed Air	Min. 6 bar (87 psi) · ISO 8573-1 Class 1:2:1 · flow < 250 L/min
Nitrogen	N_2 5.0 (99.999%) · min. 2.5 bar (36 psi) · operating flow ≤ 1.0 L/min

HS-JM SERIES

Screenless

Solder Ball Attachment

HS-JM is a fully automatic, high-speed solder ball placement system. Flux is dispensed by piezo needle and the solder balls are jetted onto the pads without contact, at 40 to 200 balls per second depending on the model. No screen is needed, which saves tooling cost, shortens development and keeps changeover to about 30 minutes. It handles warped substrates, and different ball sizes or ball alloys on the same substrate.



40 – 200
Balls per Second, by Model

±2 µm
Mechanical Accuracy

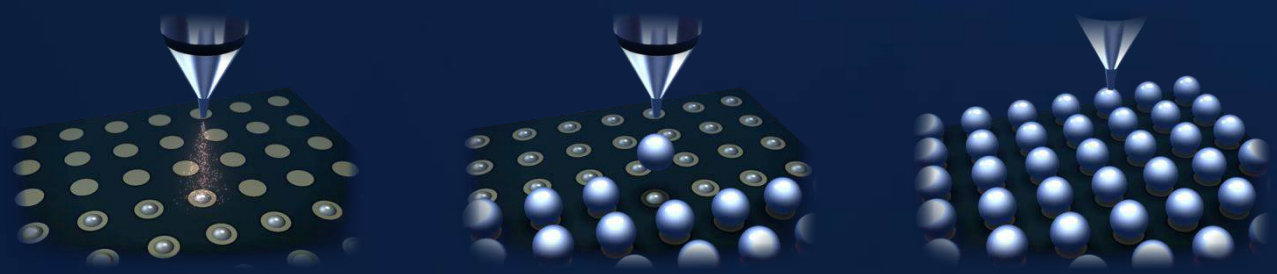
100 – 760
Solder Ball Diameter Φ (µm)

0
Ball-Mount Screens

Process Advantages

- No Tooling
- Handles Warpage
- Mixed Ball Sizes
- Mixed Ball Alloys
- ~30 min Changeover
- Pairs with HS-R

How It Works



01 Flux Paste Dispensing
Flux is dispensed onto the pads by piezo microdispensing.

02 JET
Solder balls are jetted onto the fluxed pads.

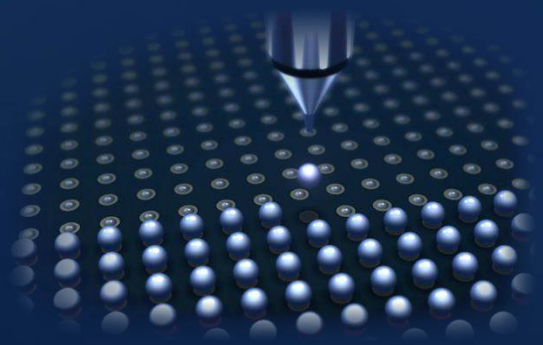
03 DONE
The array is complete, without screen.

ADVANCED PACKAGING EQUIPMENT

HS-JM · Technical Data

HS-JM Specifications

Three models, from 40 to 200 balls per second. All placed contactless and screenless.



±2 µm

Mechanical Accuracy

Specifications

Model	HS-JM1	HS-JM2	HS-JM4 (New)
Dimensions (L × W × H)	1400 × 1850 × 1700 mm	1760 × 1720 × 1700 mm	1720 × 2140 × 1800 mm
Product Size (W × L)	75 × 75 – 180 × 360 mm	75 × 75 – 180 × 360 mm	75 × 75 – 160 × 310 mm
Product Thickness	0.1 – 5 mm		
Working Height	930 ± 20 mm		
Placement Method	Non-contact		
Ball Diameter	Φ100 – Φ760 µm		
Ball Pitch	250 µm – 1.27 mm		
Mechanical Accuracy	±2 µm		
Vision Resolution	3.6 µm / pixel		
Placement Accuracy	¼ of the solder ball diameter		
Dispensing Accuracy	±35 µm		
Placement Speed	40 – 65 balls/s	80 – 100 balls/s	160 – 200 balls/s
Dispensing Speed	150 – 200 dots/s	150 – 200 dots/s	300 – 400 dots/s
Flux Spray Method	Piezo microdispensing, fixed-point fluxing		
Power Supply	AC 220 V, 50 Hz, 16 kW	AC 220 V, 50 Hz, 16 kW	AC 220 V, 50 Hz, 32 kW
Gas Supply	≥ 0.6 MPa		
Weight	≈ 1600 kg	≈ 2000 kg	≈ 3500 kg

Placement and dispensing speeds are fixed-point. Pairs with HS-R for inspection and repair → P. 9

HS-R SERIES

Automatic

Solder Ball Rework

HS-R is a fully automatic, non-contact solder ball repair system. CCD vision inspects ball-placed substrates and identifies extra, missing and offset balls. Unwanted balls are removed by vacuum and collected, flux is re-applied with precise control of volume, and new balls are jetted onto the pads. Linear motors with grating scales give fast, accurate motion, and a calibration platform corrects head position and height for each product.



20 – 40 s
Inspection per Substrate

40 /s
Repair Placement Speed

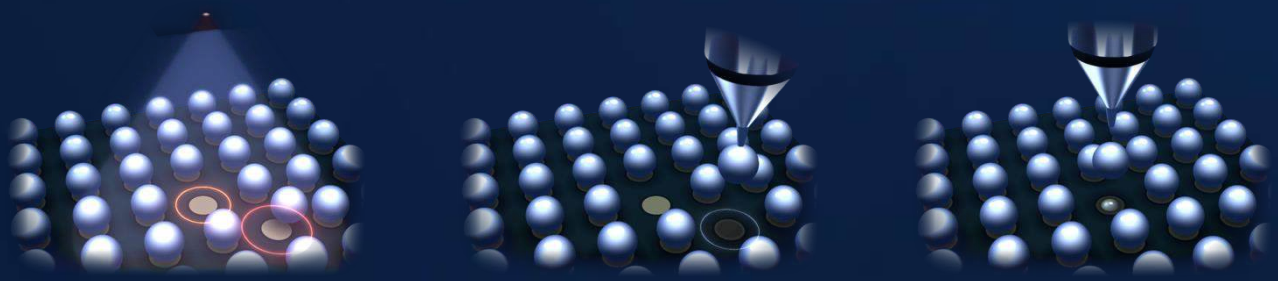
100 – 760
Solder Ball Diameter Φ (µm)

≤ ¼ Ø
Repair Ball Accuracy

Process Advantages

- CCD Inspection
- Vacuum Removal
- Precise Flux appl.
- Calibration Platform
- Linear Motor Drive
- Pairs with HS-JM

How It Works



01 INSPECT
CCD vision finds extra, missing or offset balls.

02 REMOVE
Unwanted balls are removed by vacuum and collected.

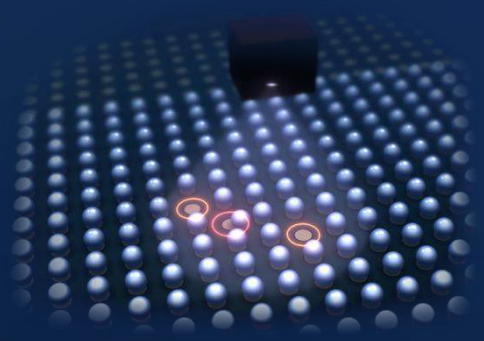
03 RE-PLACE
Flux is re-applied and a new ball is jetted.

ADVANCED PACKAGING EQUIPMENT

HS-R · M1-SR Technical Data

HS-R Specifications

Fully automatic inspection and repair of ball-placed substrates, without contact.



≤ ¼ Ø

Repair Ball Accuracy

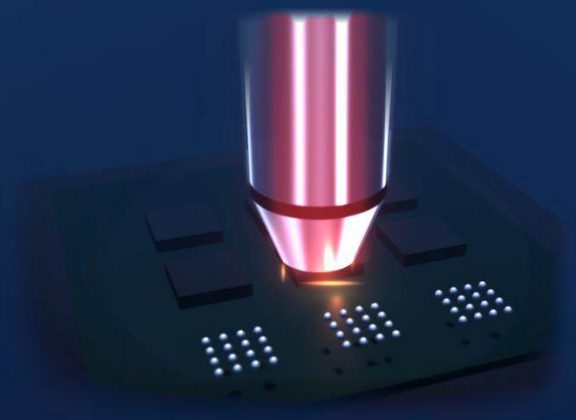
Specifications

Model	M1-SR
Dimensions (L × W × H)	1050 × 1650 × 1650 mm
Product Size (W × L)	75 × 75 mm to 165 × 310 mm
Product Thickness	0.1 – 5 mm
Working Height	900 ± 20 mm
Inspection Speed	20 – 40 s per substrate
Placement Method	Non-contact solder ball jetting
Defective Ball Removal	Vacuum removal and collection
Flux Supply	Single-point flux transfer
Ball Diameter	Φ100 – Φ760 µm
Repair Ball Accuracy	≤ ¼ of the solder ball diameter
Placement Capacity	40 balls/s, fixed-point
Power Supply	AC 220 V, 50 Hz, 8 kW
Nitrogen	≥ 0.4 MPa
Compressed Air	≥ 0.6 MPa

Pairs with HS-JM for a place, inspect and repair line → P. 7

LCB SERIES · Laser Compression Bonding

LCB
Laser Compression Bonding



The bond head holds and presses the die while the laser heats the die and its joints, for chip-to-wafer and chip-to-substrate bonding.

~30 s

Per Die, Estimated

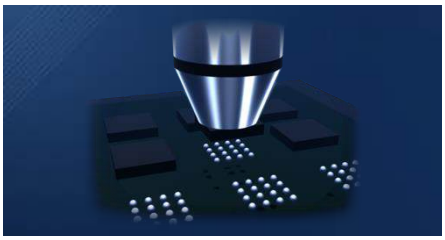
Process Advantages

- **Faster than TCB**
  No bond head heat-up and cool-down for every die, so each bond cycle is shorter.
- **Heat only where it is needed**
  The laser heats the die and its joints. TCB heats the whole die through a hot bond head.
- **Cooler substrate, less warpage**
  Heat stays local, so thin substrates and wafers see far less thermal stress than with TCB.
- **Same pressure and height control**
  The die is still held and pressed during bonding, so placement and bond height stay controlled.

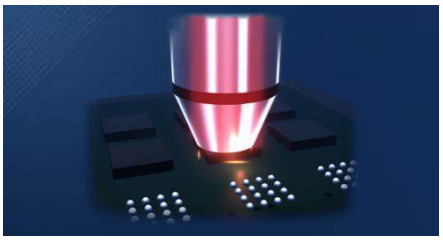
Specifications

Process	Laser compression bonding
Bonding	Die held and pressed by the bond head during bonding
Heating	Laser through the bond head; heat stays at the die and its joints
Cycle Time	Approx. 30 s per die (estimated)
Applications	Chip-to-wafer, chip-to-substrate, flip-chip and advanced packages

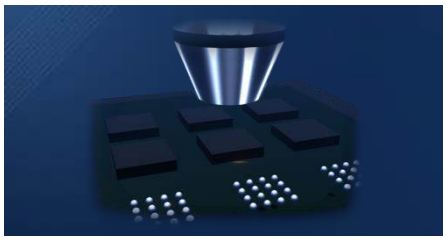
How it works



01 PICK & ALIGN
The bond head holds the die over the bumps.



02 PRESS & HEAT
The die is pressed while the laser heats the joints.



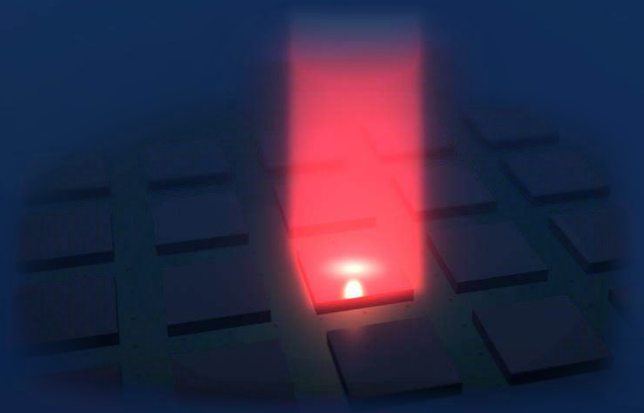
03 BOND
The joints form at a controlled bond height.

ADVANCED PACKAGING EQUIPMENT

LAB SERIES · Laser Assisted Bonding · LRTC200

LAB
Laser Assisted Bonding

A shaped laser beam reflows dies or solder ball arrays already placed on the substrate, replacing a multi-zone reflow oven.



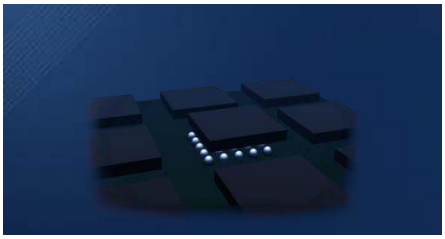
5 – 20 s

Reflow Cycle Time

Process Advantages

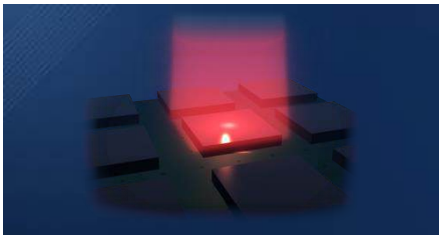
- **Heats only the exposed area**
  A reflow oven heats the whole board and every part on it.
- **5–20 s, not a full oven profile**
  Short exposure with far less residual heat than an oven.
- **Lower running cost**
  At least 2× less power and 10× less N_2 than an oven.
- **Half the footprint**
  Half the footprint of a multi-zone reflow oven.

How it works



01 PLACE

Dies or ball arrays are placed on the substrate.



02 LASER REFLOW

A shaped laser beam reflows the joints in 5–20 s.



03 SELF-ALIGN

Dies self-align in the liquid solder phase.

Specifications

Model	LRTC200	**Beam**	Modulated power density and shaped geometry
Reflow Cycle Time	5 – 20 s	**Temperature Control**	Parallel optical measurement, instant regulation
Laser Power	Up to 4 kW	**Process Gas**	Optional active or passive gas flushing
Exposure Area	Up to 110 × 110 mm	**Alignment**	Self-alignment in the liquid solder phase
Working Area	Up to 300 × 300 mm, customisable	**Dimensions (L × W × H)**	1100 × 1350 × 1950 mm
Substrates	FR4, ceramic, PVC, PET, PP, etc.	**Shear Test (200 µm ball)**	Avg. 168.2 gf · failure mode 1 · no peeling

ART-TRONIX.COM
ARRAY REBALLING TECHNOLOGY

ADVANCED PACKAGING EQUIPMENT

WORKING WITH ART-Tronix

How a project starts

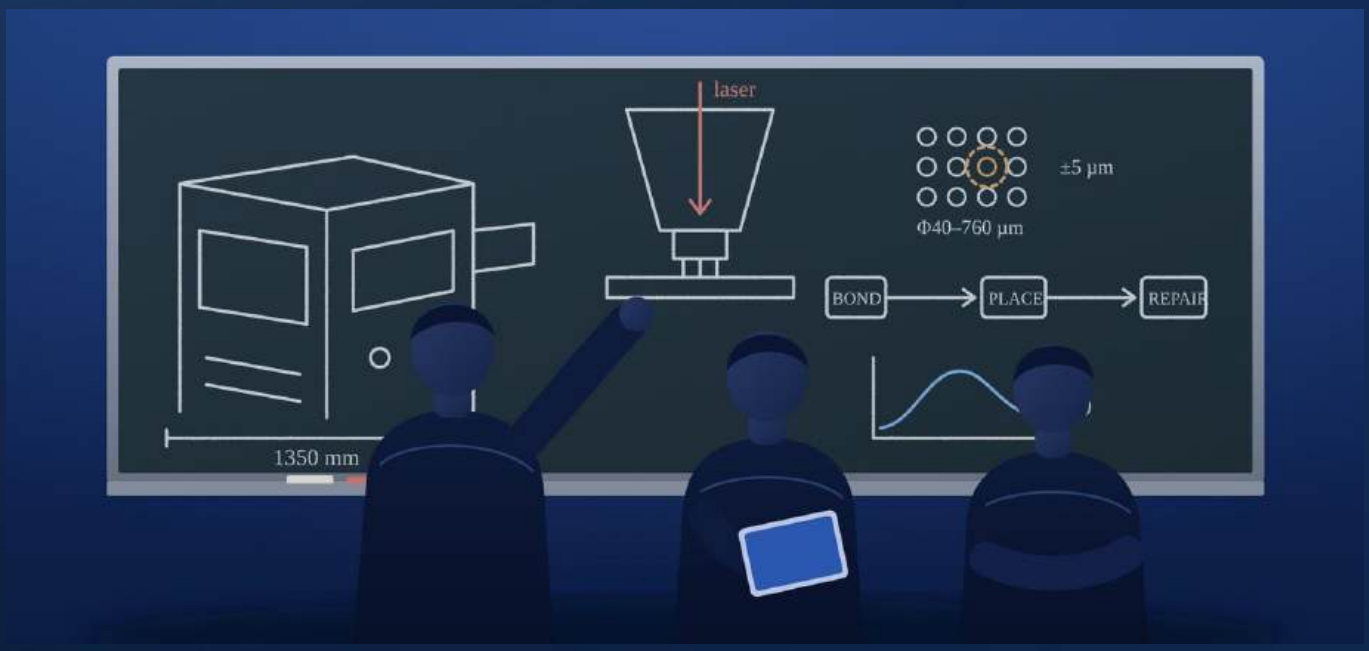
Projects usually start with a sample run on your own parts at our facility. The machine will be configured for your process.

01
Send samples
Your substrates, packages and target specifications.

02
Sample run
We run them on LSJ, HS-JM, HS-R, LCB or LAB in our facility and share the results.

03
Configure
Ball size, alloy, feeding and line integration are set up.

04
Install & support
Installation, training, spare parts and service by us.



OUR FACILITY · DEVELOP · BUILD & TEST · SUPPORT

TALK TO US

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5521 DA EERSEL
The Netherlands

Business Hours

Monday:	08:00 - 17:00
Tuesday:	08:00 - 17:00
Wednesday:	08:00 - 17:00
Thursday:	08:00 - 17:00
Friday:	08:00 - 17:00
Saturday:	CLOSED
Sunday:	CLOSED