



ASM AMICRA Inside Photonics

ENABLING THE DIGITAL WORLD

ASM AMICRA Microtechnologies GmbH

ASM AMICRA Microtechnologies is a world-wide leading supplier of ultra-high precision Die Attach Equipment specializing in submicron placement accuracy ($\pm 0.3\mu\text{m}$ @ 3 sigma). Our equipment offering supports:

- **Die Attach and Flip Chip Bonding**
- **High Speed Wafer Inking and Inspection**
- **High Speed Dispense System**

We continuously strive to provide our valued customers with extraordinary, high-technological engineering services & products for the whole industry field of microelectronics. With our dedicated team of highly experienced, creative technical and manufacturing professionals, we have collected more than 15 years of knowledge in all kinds of advanced micro assembly solutions.

Throughout the years we have developed advanced features and capabilities to support specific Advanced Packaging Markets in the backend assembly arena. ASM AMICRA's Die Attach solutions continue to enable the advanced packaging market to push the boundaries forward and beyond. These unique innovative solutions enable our customer base to achieve some of the most accurate die placement performance in the world today while maintaining bonding rates that are 2x and 3x faster than our closest competitor in the markets we serve, resulting in a value proposition that is second to none.



2001

Establishment of AMICRA Microtechnologies by Rudolf Kaiser and Horst Lapsien

2003

Development of AFC Flip Chip

2008

Company HQ is moved to Wernerwerkstr. 4 Regensburg, Germany

2010

Product Launch of NOVA^{Plus}

2011

Product Launch of AFC^{Plus}



Dr. Johann Weinhändler

Managing Director – Sales, Marketing,
Business Development and Quality Management

- Responsible for worldwide Business Development and the internationalization of ASM AMICRA
- Success in attracting internationally renowned clients
- Serves the role of the “visionary” and the “internationaliser” with strong experience in the semiconductor industry



Rudolf Kaiser

Managing Director – Finance, Administration, Software
and Application

- Was a Co-founder of AMICRA Microtechnologies GmbH
- Played an essential part in the development of control software and customer applications for ASM AMICRA
- He is the generalist of the management team



Horst Lapsien

Managing Director – Design & Production

- Was a Co-founder of AMICRA Microtechnologies GmbH
- The technology platform of ASM AMICRA is mainly the result of Horst Lapsien’s development of precision mechanics
- Has a decisive role in the decisions and overall technical concepts of the ASM AMICRA systems



2013

Second location is added in Regensburg, as well as branch offices in the US and Singapore

2017

Opening of new HQ at Marie-Curie-Str. 6 Regensburg, Germany and launch of NANO

2018

Acquired by ASM Pacific Technologies and renamed ASM AMICRA Microtechnologies GmbH

2019

Winner of the productronica Innovation Award 2019 for the latest development CoS Die Bonder

About ASM Pacific Technologies

ASM Pacific Technology Limited (ASMPT) is a leading integrated solutions provider in semiconductor and electronics industries. The three business segments with leading market positions include:

- Back-end Equipment
- Materials Business
- SMT Solutions Business

Solutions include:

- Advanced Packaging
- Advanced Fine Pitch
- Copper Bonding
- Encapsulation
- Image Sensor
- Leadframe
- LED/Opto
- Low Pin Count & Discrete Applications
- Smart SMT Factory
- Display
- COB
- Photonics

ASMPT at a Glance

ASMPT is a world leader in the supply of semiconductor assembly and packaging equipment and materials as well as surface mount technology solutions.

1975
Incorporated

Present in **30+** countries

#1
Assembly & Packaging Equipment
Market

17.500
Employees Worldwide

10
R&D Centers Worldwide

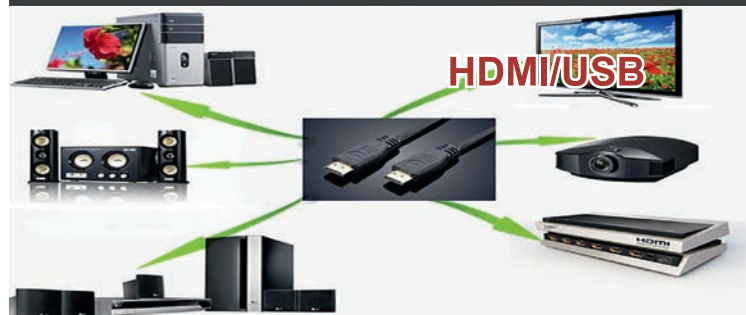
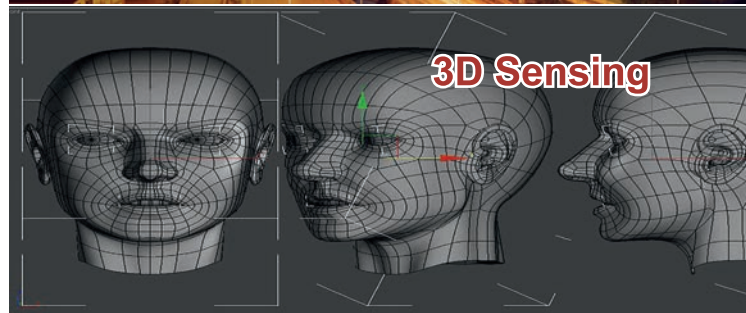
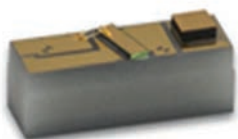
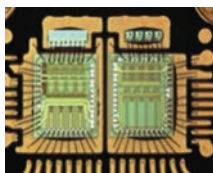
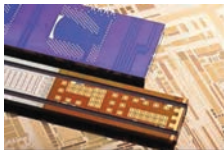
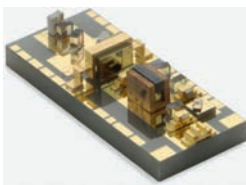
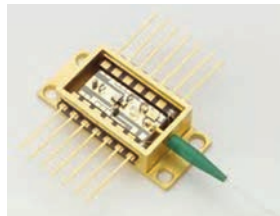
12
Significant manufacturing
operations worldwide



Packaging for Photonics

With more than 40 years experience, extensive R&D capabilities and a full product portfolio, ASM provides innovative solutions across all Photonics applications including:

- Chip on Submount (COS)
- Chip on Chip (COC)
- USB
- HDMI
- COB
- Butterfly
- BOX
- TO-can
- Silicon photonics



NANO

Ultra-Precision Die Bonder

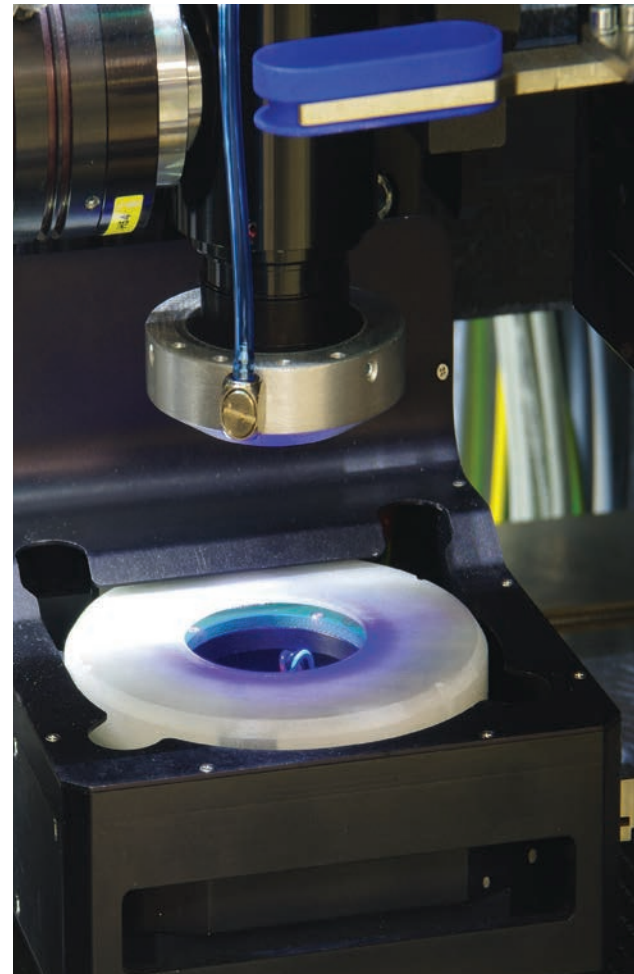
NANO is our ultra-precision die and flip chip bonder for highly demanding assembly tasks billed as the highest-precision placement system in its class. The NANO supports a $\pm 0.3\mu\text{m}$ placement accuracy at full speed and at 3 sigma.

It offers a host of outstanding features: quantitative parallelism calibration for large panel handling (up to 300 x 300mm), eutectic, as well as epoxy and UV bonding, UV dispensing, and in-situ curing.

The available dispensing options support all common dispenser technologies, and material traceability. Additionally, it offers three different heated options and is equipped for laser soldering and active bond force control. It is built on a vibration-free, high-quality granite platform.

Aiming at today's, and future placement demands, NANO enables the reliable handling of ultra-small and very thin die.

The NANO Die Bonding system's capabilities are perfect for optical device packaging, such as silicon photonics and semiconductor (TSV, DBI) applications.



NANO OVERVIEW

NANO is our ultra-precision die and flip chip bonder for highly demanding assembly tasks, which includes the following features:

- Supports $\pm 0.3\mu\text{m}$ @ 3 sigma placement accuracy
- Supports all Die attach and Flip Chip applications
- High precision alignment optics
- Vibration Damping System
- Automatic Placement Off set Tuning System
- High resolution 300mm Bonding Station
- Dynamic Alignment System
- Quantitative Parallelism Calibration
- In-situ Eutectic Bonding Capability
- 3x Different Heated Options incl. Laser Soldering System
- Active Bond Force Control from 0.1 to 20N
- Epoxy Stamping and Dispensing capability
- UV Curing capability at the Bond Station
- Post-bond Inspection and Wafer Mapping Software
- Clean Room Inside with HEPA Filter and Ionizer
- Modular Machine Concept

**HIGHEST
PLACEMENT
ACCURACY
IN ITS
CLASS!**

MARKETS

Single Mode/SiPhotonics/PIC/AOC/WLP

Optical Device Packaging

Direct Bond Interconnect

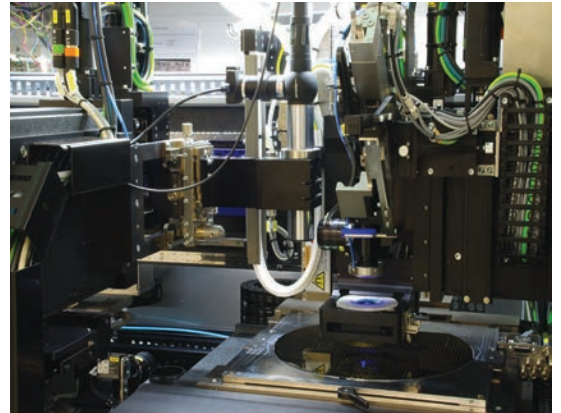


AFC^{Plus}

Fully Automatic Sub-Micron Die Bonder

AFC^{Plus} is one of the most advanced die bonding systems on the market today. It is uncommon to find a precision die bonder that can maintain a placement accuracy down to $\pm 1\mu\text{m}$ @ 3 sigma while bonding with temperatures exceeding 350°C and while also applying high bonding forces.

In many cases this type of die bonding can be classified as thermocompression bonding or TCB. And in other cases, these capabilities are also required for through silicon via or TSV. As a larger category of Advanced Packaging Die Attach, the AFC Plus is considered one of the most flexible Die Bonders on the market today. This capability makes the AFC Plus Die Bonding system perfect for optical device packaging, and semiconductor (TSV, DBI, CtW, CtC) applications.



AFC^{Plus} OVERVIEW

The **AFC^{Plus} Die Bonder/Flip Chip Bonder** is fully automatic, with exceptionally high precision and placement accuracy and includes the following:

- Accuracy $\pm 1\mu\text{m}$ @ 3 sigma
- Assembly of chip and micro-optics (WDM, optoelectronic components, micro-lenses, micro-mechanics)
- Auto loading for substrate wafers
- Epoxy stamping and dispensing
- Eutectic bonding via diode-laser or heating plate
- Passive alignment

Optional:

- Flip chip bonding
- Wafer mapping
- Post bond inspection/measurement
- UV-Curing
- ... and more!

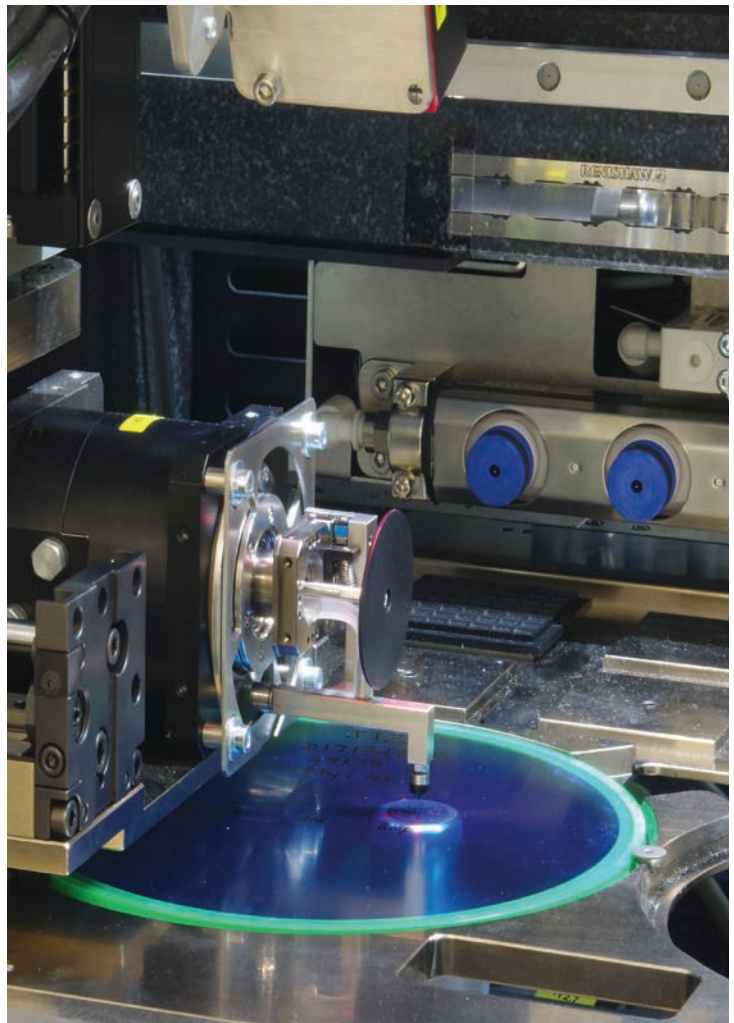
MARKETS

AOC/VCSEL/Multi Mode/LiDAR

Silicon Photonics

Laser Bar and MEMS Assembly

Semiconductor Advanced Packaging
(3D, Stack Die, etc.)



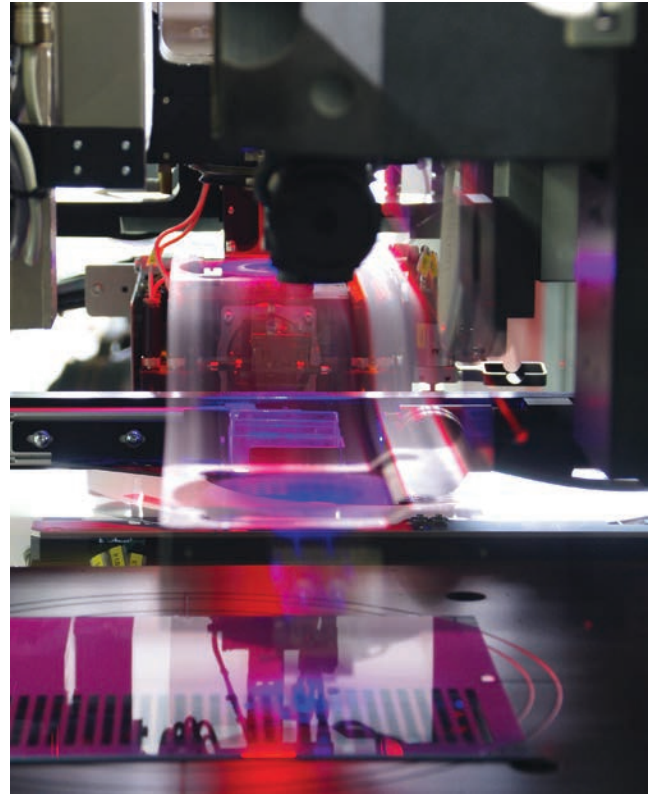
NOVA^{Plus}

High-Speed Dual Head Die Bonder

NOVA^{Plus} offers the same basic die bonding technology as the AFC^{Plus} but with the additional capabilities: High Speed Assembly, Large Die Bonding area, accommodating WLP Gen 4 and eWLP for the Fan-out (FOWLP) and Fan-in die bonding processes.

The NOVA^{Plus} is truly unique to the Advanced Packaging Die Bonding market because of its ultra large substrate working area, (550x600mm and larger) all while maintaining a $\pm 2.5\mu\text{m}$ @ 3 sigma placement accuracy. It can bond at high speed because of its dual bonding head system.

The NOVA^{Plus} Die Bonding system is perfectly suited for the low end optical device packaging (VCSEL, Pin, Lens Attach) and semiconductor (TSV, FanOut, eWLB, Flipchip, etc.) applications.



NOVA^{Plus} OVERVIEW

The **NOVA^{Plus} High Speed Dual Head Die Bonder & Flip Chip Bonder** offers a wide range of features including:

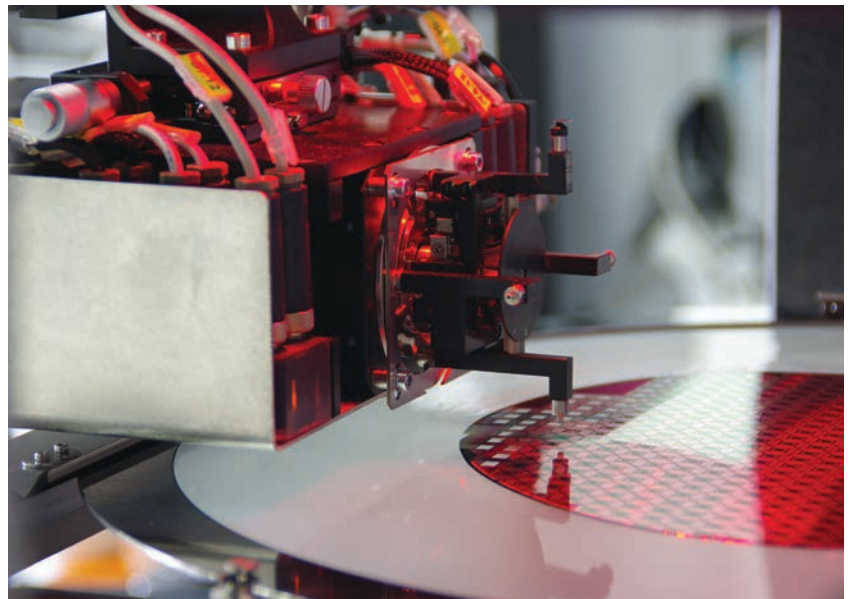
- High precision die bonder/flip chip bonder
- Accuracy +/- 2.5µm @ 3 sigma
- Cycle-time of < 3 sec*
- Modular machine concept for all micro assembly applications
- Eutectic bonding via diode-laser, a heating plate or epoxy stamping and dispensing
- Multi flip chip bonding
- Wafer mapping
- Post bond inspection/measurement
- Substrate working area of 550x600mm
- Active bond-force-control

Autoloading for up to:

- 12" wafers
- 300mm wafers
- 450mm substrate wafers
- 600x600 panels

Optional:

- UV-Curing
- dispensing ... and more!



MARKETS

Optoelectronic Device Packaging

AOC/VCSEL/Lens Assembly

Semiconductor advanced packaging
(TSV, eWLB, Fan-Out, WLP, 3D, Stack Die)

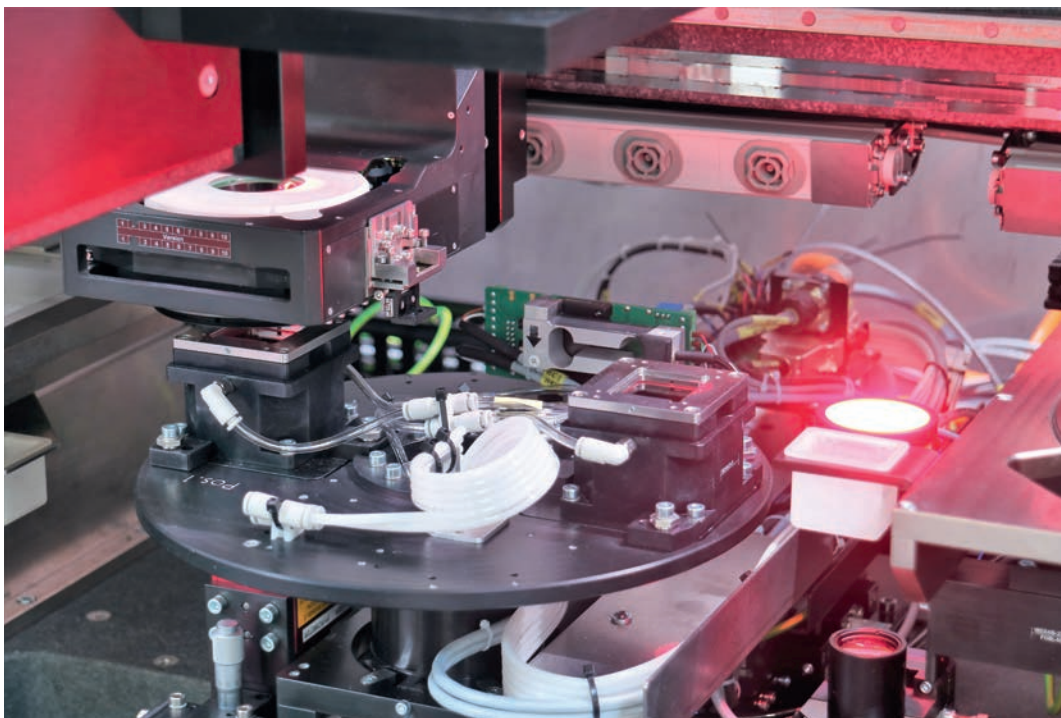
Large Paneled FanOut

MEMS/Automotive Sensors

CoS Chip-on-Submount Die Bonder

The new **CoS** machine enables manufacturers to combine optical sensors and diodes with singulated substrates into powerful and extremely small packages with much more accuracy and speed than previous solutions. This advanced packaging technology forms the basis for new applications in 5G data transmission, 3D sensor technology, augmented reality, autonomous driving, as well as industrial and medical laser applications.

ASM AMICRA won the Productronica Innovation Award at the productronica fair in November 2019 for this latest development. With this prestigious award, Messe München and the productronics magazine award every two years the most innovative novelties at the world's largest trade fair for the electronics industry.



CoS OVERVIEW

The **CoS Die Bonder** is our newest development and offers a wide range of features including:

- Up to +/- 3µm @ 3 sigma placement accuracy
- Dedicated for Chip on Chip/Submount/Carrier Applications
- Manual Loading / Unloading of Wafers and Substrates
- Cycle Time 6-10 sec (depending on application)
- Die size 0.15x0.15mm - 3x8mm with laser heating
0.15x0.15mm - 8x8mm with pulse heating
- Substrate Size 0.3x0.3mm - 16x16mm
- Dynamic Component Alignment
- Die Attach, Flip Chip
- Separate Die Eject System for Chip and Submount for single submount handling
- Eutectic Bonding Capability
- Heated Bondhead for up to 350°C
- Ceramic Pulse Heater for up to 400°C
- Two pickup heads for Submount load in unloading
- Active Bond Force Control, Bond Force from 5-500g
- Post-bond inspection
- Wafer-Mapping
- Submount input and output stage for Wafer, GelPak, Waffle Pack

Optional:

- Flip Chip Unit
- Epoxy Stamping Unit
- Dispensing Unit

MARKETS

SiPhotonics

Optical device Packaging

Data Communication / 5G

3D Sensor / LiDAR

Augmented Reality



Applications

Customer specific solutions

PIC/SiPhotonics

We offer four die attach solutions to address the SiPh/PIC market segment, primarily serving the high-volume production segment of the SiPh/PIC market.

NANO supports:

Accuracies down to $\pm 0.3\mu\text{m}$ @ 3 sigma offering best in class placement accuracy

AFC^{Plus} supports:

Die placement accuracies down to $\pm 1\mu\text{m}$ @ 3 sigma

NOVA^{Plus} supports:

Die placement accuracies down to $\pm 2.5\mu\text{m}$ @ 3 sigma

CoS supports:

Die placement accuracies down to $\pm 3\mu\text{m}$ @ 3 sigma

Automotive Sensors/LiDAR

We primarily serve the high volume production segment of the TCB market.

NANO supports:

Accuracies down to $\pm 0.3\mu\text{m}$ @ 3 sigma offering best in class placement accuracy

AFC^{Plus} supports:

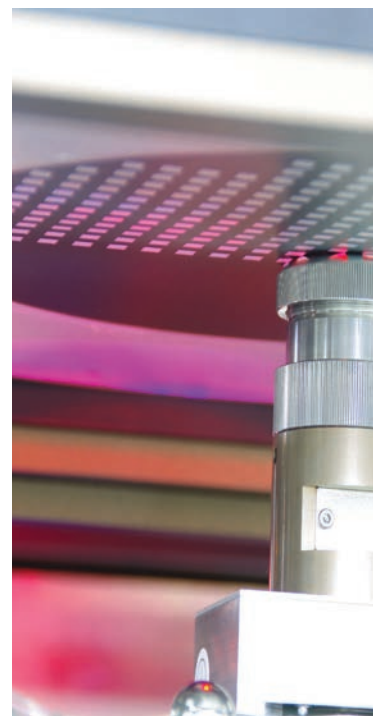
Die placement accuracies down to $\pm 1\mu\text{m}$ @ 3 sigma

NOVA^{Plus} supports:

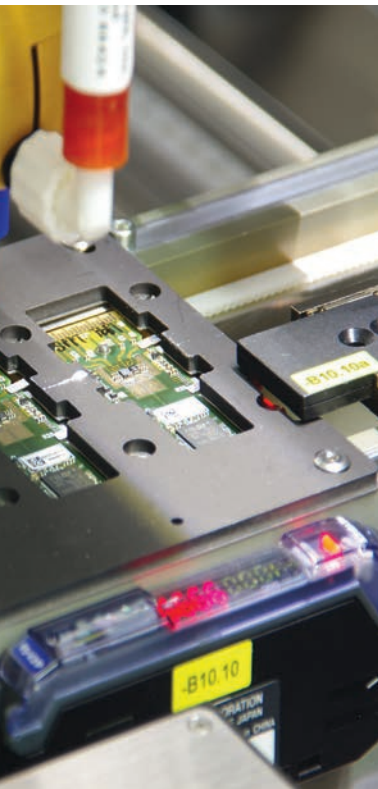
Die placement accuracies down to $\pm 2.5\mu\text{m}$ @ 3 sigma

CoS supports:

Die placement accuracies down to $\pm 3\mu\text{m}$ @ 3 sigma



Meeting the needs of advanced packaging



Optoelectronics

We offer four die attach solutions to address the AOC market segment. We primarily serve the high volume production segment of the AOC market.

NANO supports:

Accuracies down to $\pm 0.3\mu\text{m}$ @ 3 sigma offering best in class placement accuracy

AFC^{Plus} supports:

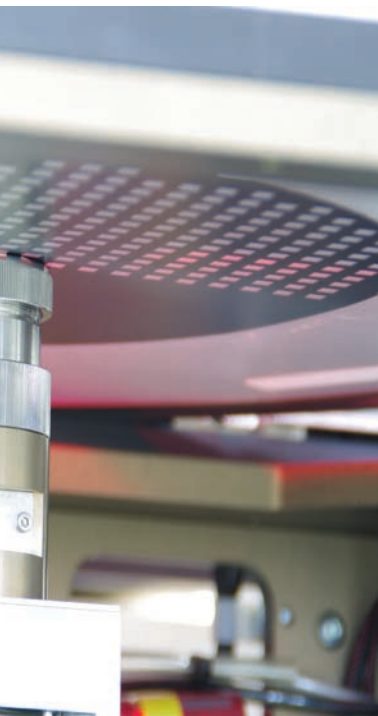
Die placement accuracies down to $\pm 1\mu\text{m}$ @ 3 sigma

NOVA^{Plus} supports:

Die placement accuracies down to $\pm 2.5\mu\text{m}$ @ 3 sigma

CoS supports:

Die placement accuracies down to $\pm 3\mu\text{m}$ @ 3 sigma



FanOut

ASM AMICRA offers a die attach solution dedicated to the FanOut process with additional features and options to support today's known process and future variations that inevitably evolve as the FanOut process matures. ASM AMICRA serves the high-volume production segment of the FanOut market.

NOVA^{Plus} supports:

Large bonding area of 600x600mm while maintaining die placement accuracies down to $\pm 2.5\mu\text{m}$ @ 3 sigma with cycle-times down to 1.2 seconds/bond or 3,000 UPH

Additional Products

Our Comprehensive Photonics Product Portfolio

Front of Line



LASER1205
Laser Dicing System



MS90
Wafer to Wafer
Map Sorter



AT420P
Waffle/Gel-Pak
Wafer Sorting Sides-Inspection

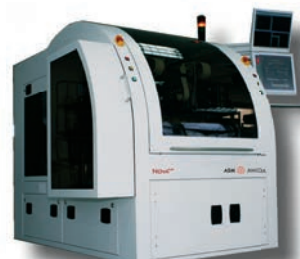
Die Attach Systems



NANO
Ultra High Precision Bonder



AFCPlus
Fully Automatic Sub-
Micron Die Bonder



NOVAPlus
High Precision Bonder



CoS
High Precision Chip-on-
Substrate Bonder



Photon/AD280 Plus
High Precision Bonder



AD211 Plus Series
Eutectic Die Bonder



AD838L Series
Epoxy Die Bonder



AD819 Series
To-can Bonder

Wire Bond



AERO Series
Horizontal Platform
Wire Bonder

Package Inspection



SeaHawk
2D AOI



SkyHawk
3D AOI

Lens Attach



AD280 Plus
Passive Lens Attach
System

ASM  AMICRA

Ultra high precision die attach solutions to address the fast-growing silicon photonics market

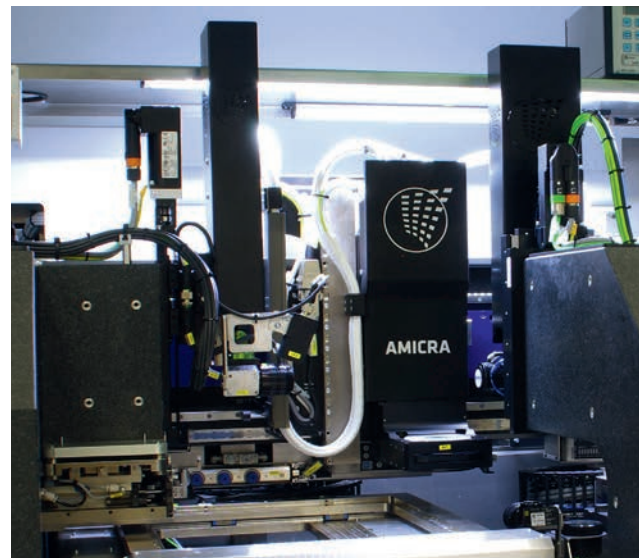
Service & Contact

In 2017 the ASM AMICRA headquarter in Regensburg, Germany, moved locally to a new industrial site and was substantially enlarged to now encompass 5000 m² of work space, of which 1500 m² are equipped as its main production floor, including:

- 600m² cleanroom
- demo space for the AMICRA systems
- ASM Center of Competence Automotive Europe

In addition, our sales representatives are available worldwide in Asia, Europe and throughout the USA.

Do not hesitate to contact us!





CONTACT

Head Office

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93055 Regensburg

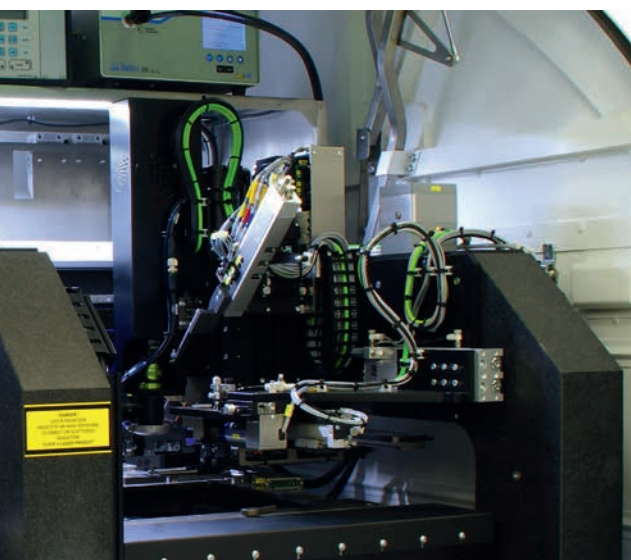
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