



# NOVA<sup>PLUS</sup>

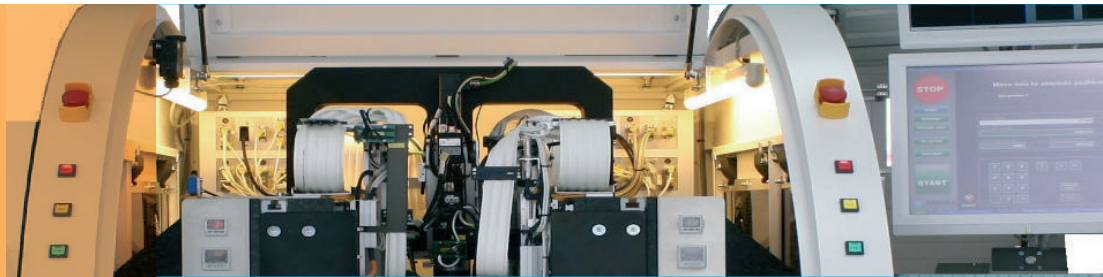
accuracy meets speed

**MORE THAN PRECISION**

MORE THAN PRECISION

# NOVA<sup>PLUS</sup>

Precision of  
Assembly +/- 3  $\mu\text{m}$

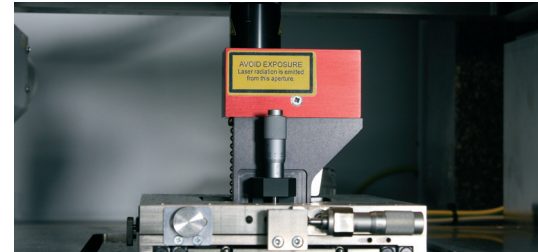


- Modular machine concept
- Multi-chip capability
- +/- 3  $\mu\text{m}$  placement accuracy
- Multi-flip-chip option
- Assembly of chip and micro-components
- Wafer mapping
- Epoxy stamping and dispensing
- Eutectic bonding via diode-laser or heatingplate
- UV-Curing option
- Dispensing option
- Active / Passive alignment
- Active bond-force -control
- Postbond inspection



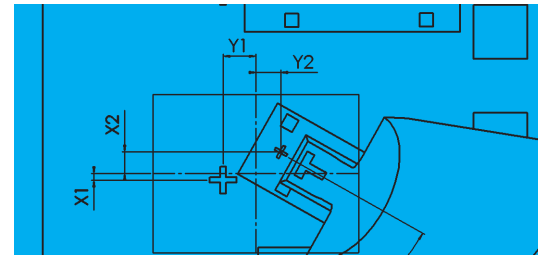
## Laser and Eutectic Soldering

- Adjustable heating courses with high soldering temperatures (up to 400° for AuSn-solder)
- Shortest soldering time (<1s)
- Best yield and high quality by repeatability of laser soldering
- Up to 350° C Substrate heating (option)
- Hot pick up tool (up to 300° C)



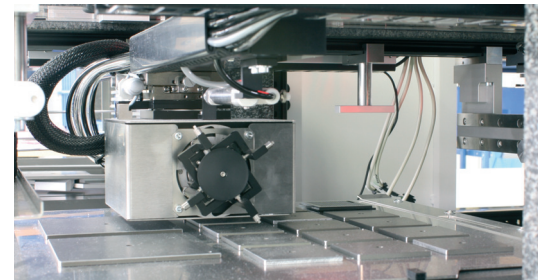
## Technical Concept

- Relative positioning
- Positioning substrate to camera coordinate system X,Y,Phi
- Positioning chip to camera coordinate system X,Y,Phi



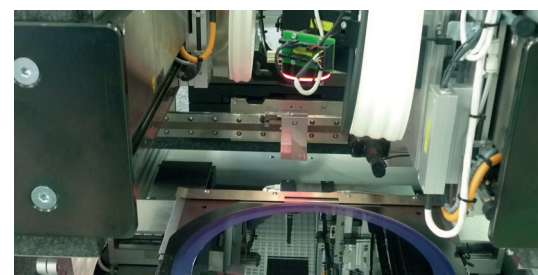
## Precision Components

- Vibration damping due granite base design
- High precision stages driven by AC motors
- Precision vision system with high resolution CCD-cameras
- High accuracy bondhead with piezo systems
- Multi-flip-Chip-Unit
- Up to 12" Wafer, Wafflepack, Gel-Pak
- Tool changng unit
- Working area 600 x 600 mm



## Active/Passive alignment

- Permanent observation of the components through stationary high resolution cameras
- Controlling the position during alignment and setting process
- Die alignment to active components (e.g. microlenses to energized laserchip)
- Die alignment to fiducial marks (e.g. V-groove)
- Flipped Die alignment through up- and down-side correlation



# Technical Informations

## General

control	multi-axis-controller
operating system	Windows XP
programming	keyboard and graphic display
operator interface	menu driven, English
data transfer	ethernet TCP/IP , electronic connection: 10 Base T, 10 Mbit/s

## Equipment

### BONDHEAD TRANSFER SYSTEM

function moves bondhead from source side (chip side) to destination side (substrate side)

y axis positioning linear motor driven, high velocity and acceleration; noncontact linear encoder, resolution 1µm

Z axis linear motor drive, noncontact linear encoder, resolution 1µm

### DESTINATION TABLE FOR SUBSTRATE

XY axis AC servo drive, resolution 0.1 µm

range of XY axis 300 x 300 mm

### SOURCE TABLE FOR WAFER

XY axis linear motor driven, open-frame design

range of XY axis 300 x 300 mm

substrate size up to 600 x 600 mm

### CAMERA AXIS

Z axis (focussing) AC servo drive, resolution 1 µm

### BOND HEAD

function design for active adjustment; high accuracy positioning; bondforce controlling

rotation axis 360°, resolution 0.001°

bond force programmable, standard working area 10 - 7000 g; resolution 0.5 g (other working area available)

touch sensor determines first mechanical contact between chip and substrate

### MULTI EJECTION SYSTEMS

needle systems single or multi-needle system according to component size

ejection needle type 0.7 mm shaft diameter, 17.0 mm long, radius 25µm, other needles on request

ejection height programmable height and delays

ejection speed programmable

### PICKUP SYSTEM

pick up tool up to 8 different pick up tools

## Lasersystem (optional)

function for fast eutectic bonding with controlled heat technique fiber-coupled high power laser with focussing optic

max. output power 45 W or 75 W

center wavelength 808 nm (+-10%) other wavelength on request

temperature programmable, range: up to 400° C; online measurement pyrometer

pulsetime programmable, range: 0.01s to 9.99s; resolution: 10ms

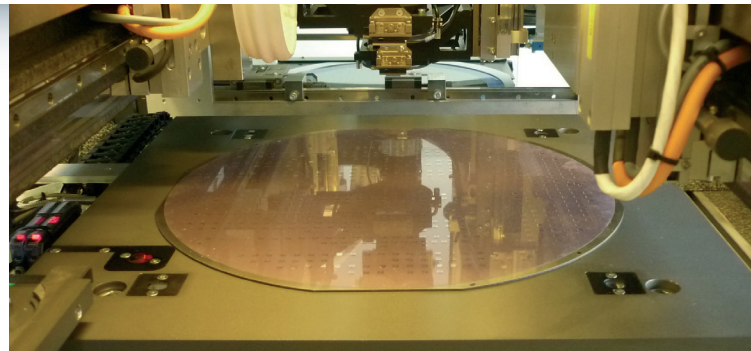
## Image Recognition

vision System COGNEX

focussing programmable; optional autofocus function during programming

recognition methods standard vision tools; special filter for micro structures

pattern recognition programmable windows and models



### SOURCE CAMERA (MATERIAL SIDE E.G. LASERCHIP)

depth of field +/- 0.1 mm

CCD camera chip size 1/2" or 1/3"

field of view approx. 5 x 1 mm<sup>2</sup> (other on request)

pixel resolution approx. 1.7 µm/Pixel at 1/2" CCD-chip

illumination coaxial lighting; LED

### DESTINATION CAMERA (SUBSTRATE SIDE)

depth of field +/- 10µm

CCD camera chip size 1/2", optional 1/3", 2/3"

magnification 10x; other magnification on request

field of view /FOV/Pixel approx. 0.64 x 0.48 mm<sup>2</sup>

resolution approx. 0.8 µm/Pixel at 1/2" CCD-chip

illumination coaxial lighting; LED or halogen

### UPWARD CAMERA FOR FLIP CHIP CORRELATION

depth of field +/- 10µm

CCD camera chip size 1/2", optional 1/3", 2/3"

magnification 10x; other magnification on request

field of view /FOV/ Pixel approx. 0.64 x 0.48 mm<sup>2</sup>

resolution approx. 0.8 µm/Pixel at 1/2" CCD-chip

illumination coaxial lighting; LED or halogen

## Dimensions/ Power ratings

size (WxDxH), weight 1200 x 1800 x 1700 mm, 1800 kg

vacuum - 0.8 bar, Throughput: 3 m<sup>2</sup>/h

compressed air 5 bar dry and oilfree air

nitrogen 1 bar

electrical power ratings distribution voltage: 400 V opt. 230 V/115V

ambient temperature 18 to 25 °C

relative humidity non-condensing

## Capacity Ratings

module-specific cycle time 3 s for 3 µm applications, 0,9 s for 10 µm applications

machine availability UP Time > 98%

accuracy <+/-3µm@3sigma within 3 seconds

<+/-10µm@3sigma within 0,9 seconds

## Applications

WLP, eWLB, embedded Die, TSV, MCM, Single Chip



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