

AFC

high accuracy
micro assembly cell

AFC

Precision of
Assembly +/- 0.5 μm



- Modular machine concept
- +/- 0.5 μm placement accuracy
- Flip-chip option
- Assembly of chip and micro-optics
 - WDM, optoelectronic components, micro-lenses, micro-mechanics
- Die Sorting
- 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



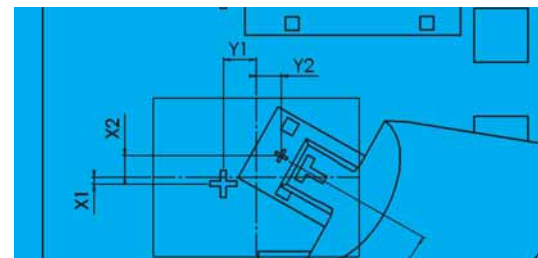
Laser and Eutectic Soldering

- 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



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
- Flip-Chip-Unit
- Wafer, Wafflepack, Gel-Pak



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)
coarse X axis positioning	linear motor driven, high velocity and acceleration; noncontact linear encoder, resolution 1µm
Z axis	AC servo drive, noncontact linear encoder, resolution 1µm

DESTINATION TABLE FOR SUBSTRATE

XY axis	AC or stepper motor driven, open-frame design (optional linear motor)
range of XY axis	210 x 210 mm
optional: rotations Axis	stepper motor-driven, 360°, resolution 0.01°

SOURCE TABLE FOR WAFER

XY axis	AC or stepper motor driven, open-frame design (optional linear motor)
range of XY axis	210 x 210 mm
optional: rotations axis	stepper motor-driven, 360°, resolution 0.01°

CAMERA AXIS

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

function	design for active adjustment; high accuracy positioning; bondforce controlling
XY axis	piezo driven; resolution 0.1µm; range 400µm x 400µm
rotation axis	360°, resolution 0.001°
bond force	programmable, standard working area 3 -100 g; resolution 0.5 g (other working area available)
touch sensor	determines first mechanical contact between chip and substrate

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

Lasersystem

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", optional 1/3", 2/3"
magnification	5x; other magnification on request
field of view	approx. 1.3 x 1 mm²
pixel resolution	approx. 1.7 µm/Pixel at 1/2" CCD-chip
illumination	coaxial lighting; LED or halogen

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 mm²
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 mm²
resolution	approx. 0.8 µm/Pixel at 1/2" CCD-chip
illumination	coaxial lighting; LED or halogen

Dimensions/ Power ratings

size (WxDxH), weight	1400 x 1200 x 1700 mm, 1800 kg
vacuum	- 0.8 bar, Throughput: 3 m³/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	>= 10.0 s depending on configuration and application
module-specific cycle time for flip-chip process	>= 13 s depending on configuration and application
throughput	
machine availability	up to 360 components/h device dependent >95%
accuracy	+/- 0.5 µm@3s

Amicra follows a policy of continuous product improvement. Specifications are subject to change without notice.



AMICRA Microtechnologies GmbH
 Wernerwerkstraße 4
 93049 Regensburg, Germany
 Tel. +49 941 208 209 0
 Fax +49 941 208 209 9
 sales@amicra.com