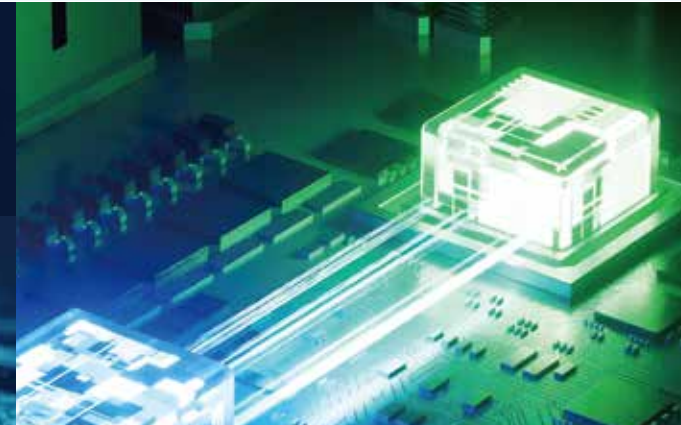


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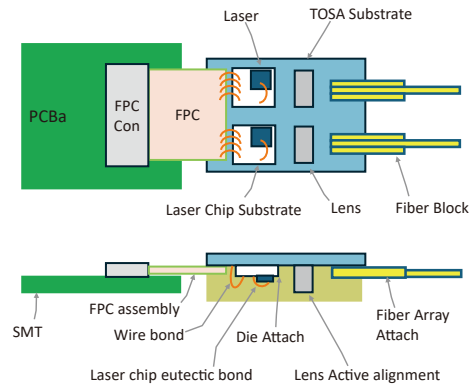
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# Tx FAU Bonder (Passive Bonding)

## Product illustration



## Station details

Station	Function	Key Point
Tx FAU Bonding	<ul style="list-style-type: none"><li>High-Definition CCD Recognition</li><li>Fixed the FAU after Coupling by UV Glue</li></ul>	<ul style="list-style-type: none"><li>High-Precision Vision CCD to Align X/Y/Z Plane</li><li>Online Monitoring and Data Uploading to Database</li></ul>

## Specification Sheet

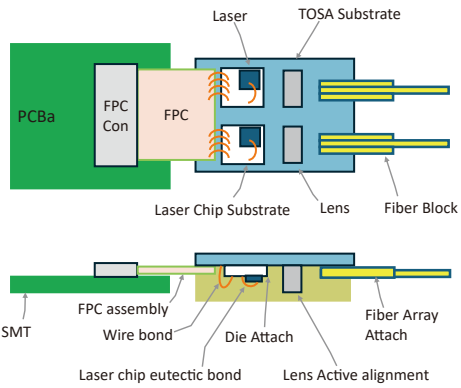
Type	Item	Parameter
Facility Requirement & Appearance	Power Input	220V 50/60Hz
	Pneumatic System	Compressed air flow >2LPM; System supply pressure 0.6MPa-0.7MPa
	Vacuum System	Vacuum gauge reading ≤ -80kPa
	Environmental Conditions	Temperature: 15-35°C; Humidity: standard 70% at 32°C; Cleanliness level: 100k Class
	Machine Dimensions	1000mm×1200mm×1800mm
	Equipment Weight	850-950kg
Safety Protection	Product Safety Protection	Contact grounding treatment
	ESD Protection	Ion fan for electrostatic removal
	Software Protection	Mistake proofing
	Equipment Protection	Collision prevention, axis stroke limit, distance sensor
	Operator Safety Protection	Protective goggles
Loading/ Unloading Module	PCB Tray (5pcs, customizable)	Linear module + servo motor
	FA Tray (5pcs, customizable)	Linear module + servo motor
Dispensing Module	Structure Configuration	Three-axis: XY axis linear step motor + Z axis servo motor + ball screw module(supporting dots and lines); Positioning accuracy: 5μm
	Dispensing system	Musashi high-precision dispensing machine, single-point (needle), Standard 3mL capacity, other volumes customizable
UV Curing System	Configuration and Parameters	Dual LED light source, pneumatic shutter, wavelength 365nm
Bonding system	Clamping	Electric gripper and vacuum suction
	Gantry System	4 axis: XY linear step motor, Z servo motor with ball screw, θ arc swing: 0.5um repeat positioning accuracy
	Visual System	Automatic alignment; 500M CCD; field of view: 10.6 × 8.9mm; resolution : 2.7μm; depth of field: 1.6mm
	Bonding Force Control	Pressure sensor monitoring: 5gF

## Major equipment

Equipment	Key Parameter
Bonding Machine	<ul style="list-style-type: none"><li>X/Y/Z Resolution: 10nm</li><li>Bonding force : 5gF</li><li>Cycle Time: &lt; 130 sec/pcs (No cover UVtime)</li></ul>

# Dual LD Lens Active Aligner

## Product illustration



## Station details

	Function	Key Point
Lens Coupling	<ul style="list-style-type: none"><li>Dual Lens Coupling</li><li>Lens Align with PIC</li><li>Fixed the Lens after Coupling by UV Glue(Include Glue Fixed and UV Curing)</li></ul>	<ul style="list-style-type: none"><li>TX Power</li><li>High-Precision Stage to Align X/Y/Z Plane</li><li>Simultaneous Coupling of Two Lens</li><li>Online monitoring and Data Uploading to Database</li></ul>

## Major equipment

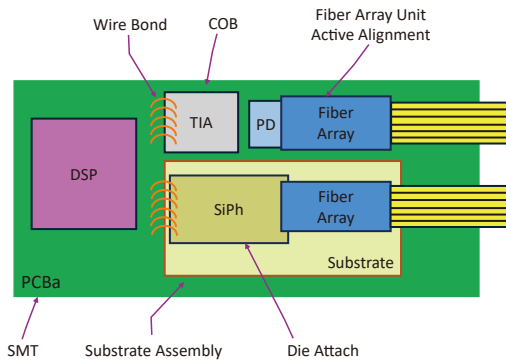
Equipment	Key Parameter
Coupling Machine	<ul style="list-style-type: none"><li>X/Y/Z Resolution: 10nm</li><li>X/Y/Z Repeatability Accuracy : ± 50nm</li></ul>

## Specification Sheet

Type	Item	Parameter
Facility Requirement & Appearance	Power Input	220V 50/60Hz
	Pneumatic System	Compressed air flow >2LPM; System supply pressure 0.6MPa-0.7MPa
	Vacuum System	Vacuum gauge reading ≤ -80kPa
	Environmental Conditions	Temperature: 15-35°C; Humidity: standard 70% at 32°C; Cleanliness level: 100k Class
	Machine Dimensions	1200mm×1000mm×1800mm
	Power Input	220V 50/60Hz
	Equipment Weight	1100-1250kg
Safety Protection	Product Safety Protection	Contact grounding treatment
	ESD Protection	Ion fan for electrostatic removal
	Software Protection	Mistake proofing
	Equipment Protection	Collision prevention, axis stroke limit, distance sensor
	Operator Safety Protection	Protective goggles
Alignment Module	Operating module	Dual 6-axis System
	Workpiece Clamping	Electric clamp, vacuum suction fixation
	Single-Axis Repeatability	±0.05μm
	XYZ Drive Mechanism	Step motor with ball screw
	θx	Manual adjustment
Dispensing Module	High-Precision Alignment Stage θy/θz	Automatic stage Repeatability: ±0.001°
	Structural Configuration	Pneumatic extension dispensing supply (XY manual stage position fixation)
	Dispensing Method	Bottom-side dispensing
Device Biasing Method	Dispensing system	Dual dispensers; Musashi high-precision single-Point dispenser (needle type), Standard 3mL capacity, other volumes customizable
	Socket connection	Automatic alignment
Loading/ Unloading Module	Lens loading tray	32pc dual lens tray
UV Curing System	PCB	Single PCB tray with Pneumatic clamping
	UV type	HOYA LED light source×4set; Wavelength 365nm
Visual system	Operate axis	6-axis, integrated in the left coupling axis
	Number of Camera	2
	Visual recognize	Automatic alignment : 5 Megapixel CCD : Visual range 5.6×4.7mm : Resolution : 1.4 μm : Depth 0.3mm
Alignment System	Camera axis	XYZ 3 axis: step motor with ball screws
	Alignment stability (Average Variance value)	<±5%
	Level adjustment	Automatic alignment module
	High adjustment	Pressure sensing
Software	CT	< 200 sec/channel (Not including curing time, Depending on application scenario)
	Programming language	LabVIEW
	Data binding	Capable to record production orders, product codes
	Storage	Production data can be saved
Power Meter	Program calls	Program base can save multiple alignment programs to fit different alignment process
	Type	Keithley E3646A (Can be modified according to requirements)
	Voltage/Current range	Keysight (0-8V,3A/0-20V, 1.5A)
	Measure resolution	Voltage: <0.05% +5mV / Electric current <0.15% + 5mA

## Rx FAU Aligner

### Product illustration



### Station details

1.6T SiPh Transceiver Module Illustration

Station	Function	Key Point
FA Coupling	<ul style="list-style-type: none"><li>• RX FA Coupling</li><li>• RX FA Align with PD</li><li>• Fixed the FA after Coupling by UV Glue (Include Glue Fixed and UV Curing)</li></ul>	<ul style="list-style-type: none"><li>• RSSI ADC</li><li>• High-Precision Stage to Align X/Y/Z Plane</li><li>• Online Monitoring and Data Uploading to Database</li></ul>

### Major equipment

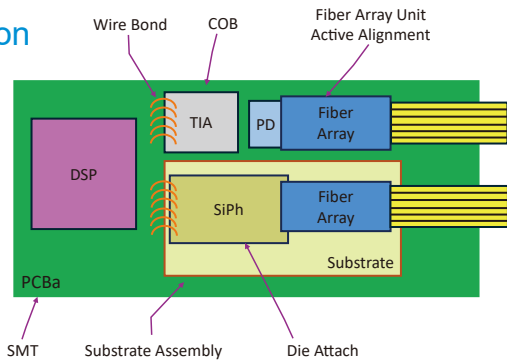
Equipment	Key Parameter
Coupling Machine	<ul style="list-style-type: none"><li>• X/Y/Z Resolution: 10nm</li><li>• X/Y/Z Repeatability Accuracy : ±50nm</li></ul>

### Specification Sheet

Type	Item	Parameter
Equipment Dimensions & Power	Power Input	220V 50/60Hz
	Pneumatic System	Compressed air flow >2LPM; System supply pressure 0.6MPa-0.7MPa
	Vacuum System	Vacuum gauge reading ≤ -80kPa
	Environmental Conditions	Temperature: 15-35°C; Humidity: standard 70% at 32°C; Cleanliness level: 100k Class
	Machine Dimensions	1150mm×1000mm×1850mm
	Equipment Weight	850-950kg
Safety Protection	Product Safety Protection	Contact grounding treatment
	ESD Protection	Ion fan for electrostatic removal
	Software Protection	Mistake proofing
	Equipment Protection	Collision prevention, axis stroke limit, distance sensor
Alignment Module	Operator Safety Protection	Protective goggles
	Operating module	6-axis module
	Workpiece Clamping	Electric clamp, vacuum suction fixation
	Single-Axis Repeatability	±0.05μm
	XYZ Drive Mechanism	Step motor with ball screw
	θx	Manual adjustment
Dispensing Module	High-Precision Alignment Stage θy/θz	Automatic stage Repeatability: ±0.001°
	Structural Type	Pneumatic extension dispensing supply (XY manual stage position fixation)
	Dispensing Method	Bottom-side dispensing
	Dispensing system	Musashi high-precision dispensing machine, single-point (needle), Standard 3mL capacity, other volumes customizable
Device Biasing Method	Socket connection	Automatic alignment
Loading/Unloading Module	FA Tray	Single MPO dual FA
	PCB Tray	Single PCB tray with Pneumatic clamping
UV Curing System	UV type	HOYA dual LED light source; Wavelength 365nm
	Operate axis	XYZ axis with air powered cylinder
Visual System	Number of cameras	2
	Visual recognize	Automatic alignment : 5 Megapixel CCD : Visual range 5.6×4.7mm : Resolution: 1.4 μm : Depth of field: 0.3mm
	Camera axis	XYZ 3 axis: step motor with ball screws
	Alignment stability (Average Variance value)	< ±5%
Alignment System	Level adjustment	Automatic alignment module
	High adjustment	Pressure sensing
	CT	< 180 sec/channel (Not including curing time, Depending on application scenario)
	Programming language	LabVIEW
Software	Data binding	Capable to record production orders, product codes
	Storage	Production data can be saved
	Program calls	Program base can save multiple alignment programs to fit different alignment process
	Meter type	Keysight E3646A(Can be modified according to requirements)
Power Meter	Voltage/Current range	Keysight (0-8V,3A/0-20V,1.5A)
	Measure resolution	Voltage: <0.05% +5mV / Electric current <0.15% + 5mA
Laser Source	Laser type	Santec(TSL-570A-P) (Can be modified according to requirements)
	Performance	200 nm/s quick scan
		High precision range(± 2 pm) & resolution(0.1 pm)
		The sealed cavity ensures the stability of each wavelength
Laser Power Meter	Sensor performance	Multiple wavelength options from 1240 to 1680 nm
		Adjust scan range 10GHz
	Type	Santec MPM-220 series (Can be modified according to requirements)
		840 - 1700 nm · -80 - +8 dBm customize option

## Tx FAU Aligner

### Product illustration



### Station details

1.6T SiPh Transceiver Module Illustration

Station	Function	Key Point
FA Coupling	<ul style="list-style-type: none"><li>• TX FA Coupling</li><li>• TX FA Align with PIC</li><li>• Fixed the FA after Coupling by UV Glue (Include Glue Fixed and UV Curing)</li></ul>	<ul style="list-style-type: none"><li>• RSSI ADC</li><li>• High-Precision Stage to Align X/Y/Z Plane</li><li>• Online Monitoring and Data Uploading to Database</li></ul>

### Major equipment

Equipment	Key Parameter
Coupling Machine	<ul style="list-style-type: none"><li>• X/Y/Z Resolution: 10nm</li><li>• X/Y/Z Repeatability Accuracy : ±50nm</li></ul>

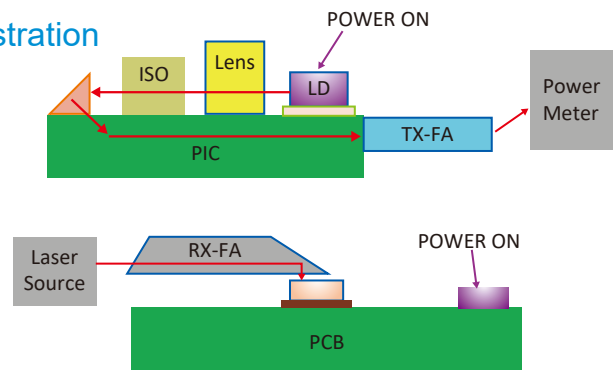
### Specification Sheet

Type	Item	Parameter
Equipment Dimensions & Power	Power Input	220V 50/60Hz
	Pneumatic System	Compressed air flow >2LPM; System supply pressure 0.6MPa-0.7MPa
	Vacuum System	Vacuum gauge reading ≤ -80kPa
	Environmental Conditions	Temperature: 15-35°C; Humidity: standard 70% at 32°C; Cleanliness level: 100k Class
	Machine Dimensions	1150mm×1000mm×1850mm
	Equipment Weight	850-950kg
Safety Protection	Product Safety Protection	Contact grounding treatment
	ESD Protection	Ion fan for electrostatic removal
	Software Protection	Mistake proofing
	Equipment Protection	Collision prevention, axis stroke limit, distance sensor
Alignment Module	Operator Safety Protection	Protective goggles
	Operating module	6-axis module
	Workpiece Clamping	Electric clamp, vacuum suction fixation
	Single-Axis Repeatability	±0.05μm
	XYZ Drive Mechanism	Step motor with ball screw
	θx	Manual adjustment
Dispensing Module	High-Precision Alignment Stage θy/θz	Automatic stage Repeatability: ±0.001°
	Structural Type	Cylinder retraction with top supply (Fixed Position for XYZ Manual module)
	Dispensing Method	Top spot glue dispensing
	Dispensing system	Dual dispensers; Musashi high-precision single-Point dispenser (Syringe type), Standard 3mL capacity, other volumes customizable
Device Biasing Method	Socket connection	Automatic alignment
Loading/Unloading System	FA Tray	Single MPO dual FA
	PCB Tray	Single PCB tray with Pneumatic clamping
UV Curing System	UV type	HOYA EXECURE-4000D
	Operate axis	XYZ axis with air powered cylinder
Visual System	Number of cameras	1
	Visual recognize	Automatic alignment : 5 Megapixel CCD : Visual range 5.6×4.7mm : Resolution: 1.4 μm : Depth of field: 0.3mm
	Camera axis	XYZ 3 axis: step motor with ball screws
	Alignment stability (Average Variance value)	< ±5%
Alignment Module	Level adjustment	Automatic alignment module
	High adjustment	Pressure sensing
	CT	< 310sec/channel (Not including curing time, Depending on application scenario)
	Programming language	LabVIEW
Software	Data binding	Capable to record production orders, product codes
	Storage	Production data can be saved
	Program calls	Program base can save multiple alignment programs to fit different alignment process
	Meter type	Keysight E3646A (Can be modified according to requirements)
Power Meter	Voltage/Current range	Keysight (0-8V,3A/0-20V,1.5A)
	Measure resolution	Voltage: <0.05% +5mV / Electric current <0.15% + 5mA
Laser power meter	Laser type	Santec MPM-220 + MPM-211×2 (Can be modified according to requirements)
	Sensor performance	1250-1650 nm · -80 - +10 dBm



## Multi-Device Active Aligner

### Product illustration



### Station details

Station	Function	Key Point
Lens Alignment & Coupling	<ul style="list-style-type: none"><li>Dual Lens Coupling</li><li>Fiber Array Rx coupling</li><li>Fiber Array Tx coupling</li><li>Isolator mounting</li></ul>	<ul style="list-style-type: none"><li>Capable of multi-device coupling &amp; mounting</li><li>High-precision stages for X/Y/Z alignment</li><li>Online Monitoring and Data Uploading to Database</li></ul>

SiPh based Transceiver Module Illustration

### Major equipment

Equipment	Key Parameter
Coupling Machine	<ul style="list-style-type: none"><li>X/Y/Z Axis Resolution : 10nm</li><li>X/Y/Z Axis Repeatability : ± 50nm</li></ul>

### Specification Sheet

Type	Item	Parameter
Equipment Dimensions & Power	Power Input	220V 50/60Hz
	Pneumatic System	Compressed air flow >2LPM; System supply pressure 0.6MPa-0.7MPa
	Vacuum System	Vacuum gauge reading ≤ -80kPa
	Environmental Conditions	Temperature: 15-35°C; Humidity: standard 70% at 32°C; Cleanliness level: 100k Class
	Machine Dimensions	1200mm×1300mm×2000mm
	Equipment Weight	1300-1500kg
Safety Protection	Product Safety Protection	Contact grounding treatment
	ESD Protection	Ion fan for electrostatic removal
	Software Protection	Mistake proofing
	Equipment Protection	Collision prevention, axis stroke limit, distance sensor
	Operator Safety Protection	Protective goggles
Alignment Module	Operating module	Dual 6-axis
	Workpiece Clamping	Electric clamp, vacuum suction fixation
	Single-Axis Repeatability	±0.05μm
	XYZ Drive Mechanism	Step motor with ball screw
	θx	Manual adjustment
	High-Precision Alignment Stage θy/θz	Automatic stage Repeatability: ±0.001°
Dispensing Module	Structural Type	Pneumatic extension dispensing supply (XY manual stage position fixation)
	Dispensing Method	Bottom-side dispensing
	Dispensing system	Musashi high-precision dispensing machine, single-point (needle), Standard 3mL capacity, other volumes customizable
Device Biasing Method	Socket connection	Automatic alignment
Loading/ Unloading Module	Lens Tray	10-pc Double Lens Magazine
	PCB Tray	Single PCB tray with Pneumatic clamping
	UV type	HOYA 365nm LED Curing Lenses x4
UV Curing System	Operate axis	6-axis assembly integrated on the left-side coupling module
	Number of cameras	3
Visual System	Visual recognize	Automatic alignment : 5 Megapixel CCD : Resolution: 1.4 μm : Depth of field: 0.3mm
	Camera axis	XYZ 3 axis: step motor with ball screws
Alignment System	Alignment stability (Average Variance value)	< ±5%
	Level adjustment	Automatic alignment module
	High adjustment	Pressure sensing
	CT	< 200 sec/channel (Depending on application scenario)
Software	Programming language	LabVIEW
	Data binding	Capable to record production orders, product codes
	Storage	Production data can be saved
	Program calls	Program base can save multiple alignment programs to fit different alignment process
Power Meter	Meter type	Keysight E3646A(Can be modified according to requirements)
	Voltage/Current range	Keysight (0-8V,3A/0-20V,1.5A)
	Measure resolution	Voltage: <0.05% +5mV / Electric current <0.15% + 5mA
Laser Source	Laser type	Santec(TSL-570A-P) (Can be modified according to requirements)
	Performance	200 nm/s quick scan
		High precision range(± 2 pm) & resolution(0.1 pm)
		The sealed cavity ensures the stability of each wavelength Multiple wavelength options from 1240 to 1680 nm Adjust scan range 10GHz
Laser Power Meter	Type	Santec MPM-220 series (Can be modified according to requirements)
	Sensor performance	840 - 1700 nm · -80 - +8 dBm customize option

## Fully Automation for HVM Lines solution

### Product illustration



### Station details

Station	Function	Key Point
FA Coupling	<ul style="list-style-type: none"><li>Alignment and Coupling for Dual Fiber Array (Rx Side)</li><li>Automatic Loading and Unloading (Magazine)</li><li>Automatic MPO Connector Plugging / Unplugging, Inspection, and Cleaning</li><li>Automatic Dispensing and UV Curing</li></ul>	<ul style="list-style-type: none"><li>RSSI ADC</li><li>High-Precision Stage to Align X/Y/Z Plane</li><li>Online Monitoring and Data Uploading to Database</li></ul>

### Major equipment

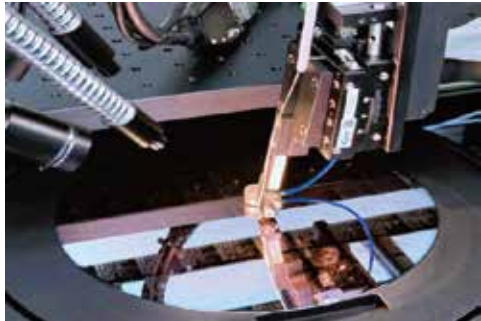
Equipment	Key Parameter
Coupling Machine	<ul style="list-style-type: none"><li>X/Y/Z Resolution: 10nm</li><li>X/Y/Z Repeatability Accuracy : ± 50nm</li></ul>

### Specification Sheet

Type	Item	Parameter
Equipment Dimensions & Power	Power Input	220V 50/60Hz
	Pneumatic System	Compressed air flow >2LPM; System supply pressure 0.6MPa-0.7MPa
	Vacuum System	Vacuum gauge reading ≤ -80kPa
	Environmental Conditions	Temperature: 15-35°C; Humidity: standard 70% at 32°C; Cleanliness level: 100k Class
	Machine Dimensions	Center: 1200mm×1300mm×2000mm : Both sides: 510mm×920mm×1700mm
	Equipment Weight	1400-1600kg
Safety Protection	Product Safety Protection	Contact grounding treatment
	ESD Protection	Ion fan for electrostatic removal
	Software Protection	Mistake proofing
	Equipment Protection	Collision prevention, axis stroke limit, distance sensor
	Operator Safety Protection	Protective goggles
Alignment Module	Operating module	Dual 6-axis
	Workpiece Clamping	Electric clamp, vacuum suction fixation
	Single-Axis Repeatability	±0.05μm
	XYZ Drive Mechanism	Step motor with ball screw
	θx	Motorized adjustment
	High-Precision Alignment Stage θy/θz	Automatic stage Repeatability: ±0.001°
Dispensing Module	Structural Type	Pneumatic extension dispensing supply (XY manual stage position fixation)
	Dispensing Method	Bottom-side dispensing
	Dispensing system	Musashi high-precision dispensing machine, single-point (needle), Standard 3mL capacity, other volumes customizable
Device Biasing Method	Socket connection	Automatic alignment
Loading/ Unloading Module	FA Tray	Single MPO dual FA
	PCB Tray	Single PCB tray with Pneumatic clamping
	UV type	HOYA dual LED light source; Wavelength 365nm
UV Curing System	Operate axis	XYZ axis with air powered cylinder
	Number of cameras	6
Visual System	Visual recognize	Automatic alignment : 5 Megapixel CCD : Resolution: 1.4 μm : Depth of field: 0.3mm
	Camera axis	XYZ 3 axis: step motor with ball screws
Alignment System	Alignment stability (Average Variance value)	< ±5%
	Level adjustment	Automatic alignment module
	High adjustment	Pressure sensing
	CT	< 180 sec/channel (Not including curing time, Depending on application scenario)
Software	Programming language	LabVIEW
	Data binding	Capable to record production orders, product codes
	Storage	Production data can be saved
	Program calls	Program base can save multiple alignment programs to fit different alignment process
Power Meter	Meter type	Keysight E3646A(Can be modified according to requirements)
	Voltage/Current range	Keysight (0-8V,3A/0-20V,1.5A)
	Measure resolution	Voltage: <0.05% +5mV / Electric current <0.15% + 5mA
Laser Source	Laser type	Santec(TSL-570A-P) (Can be modified according to requirements)
	Performance	200 nm/s quick scan
		High precision range(± 2 pm) & resolution(0.1 pm)
		The sealed cavity ensures the stability of each wavelength Multiple wavelength options from 1240 to 1680 nm Adjust scan range 10GHz
Laser Power Meter	Type	Santec MPM-220 series (Can be modified according to requirements)
	Sensor performance	840 - 1700 nm · -80 - +8 dBm customize option

# SiPh Wafer Level Test System

Wafer-Level Semi-Automated Testing Solution for Silicon Photonics



## Station details

Station	Function	Key Point
SiPh Chip Tester	<ul style="list-style-type: none"><li>• SiPh Chip Design Verification</li><li>• Academic and Laboratory Research</li><li>• Mass Production Testing and Quality Control</li></ul>	<ul style="list-style-type: none"><li>• High-Reliability Nanometer-Scale Alignment Precision</li><li>• Semi-Automated Optical Coupling and Alignment Testing</li><li>• Multiple measurement capabilities for O-O, O-E, E-O, and E-E device configuration</li></ul>

## Major equipment

Equipment	Key Parameter
Fine Positioning	<ul style="list-style-type: none"><li>• X/Y/Z Resolution: 2nm</li><li>• X/Y/Z Repeatability: 5nm</li></ul>

## Specification Sheet

Type	Item	Parameter
Equipment Dimensions & Power	Power Input	220V 50/60Hz
	Pneumatic System	Compressed air flow >500PM; System supply pressure 0.6MPa-0.7MPa
	Vacuum System	Vacuum gauge reading -53 ~ -100kPa
	Environmental Conditions	Temperature: 15-35°C; Humidity: standard 60% at 22°C; Cleanliness level: 10k Class
	Machine Dimensions	1660mm×1610mm×1550mm
	Equipment Weight	1500kg
Safety Protection	Product Safety Protection	Contact grounding treatment
	ESD Protection	Ion fan for electrostatic removal
	Software Protection	Mistake proofing
	Equipment Protection	Collision prevention, axis stroke limit, distance sensor
	Operator Safety Protection	Protective goggles
Motion and Positioning Systems (coarse positioning)	Operating module	Dual 6 axis module
	Workpiece Clamping	Electric clamp, vacuum suction fixation
	Repeatability	±0.05μm
	XYZ Drive Mechanism	Step motor with ball screw
	XYZ motion stroke	±15mm
Motion and Positioning Systems (fine positioning)	Maximum movement speed	15mm/s
	Control axis	XYZ axis
	Resolution	2nm
	Bi-directional repeatability (10% movement range)	5nm
Alignment System	Scan time - spiral area 10 μm	<0.5s
	Scan time - gradient ±5 μm	<0.3s
	Repeatability	0.02dB
Z-axis Sensing System	Sensing range	2.4mm
	Resolution	24nm
Microscope Movement System	Travel Distance	XY axis 50mm; Z axis 127mm
	Resolution	1μm
	Repeatability	±3μm
Probe Station System (XYZ platform)	Travel Distance	X axis 350mm; Y axis 365mm; Z axis 20mm
	Resolution	0.1μm
	Repeatability	±1μm
	Accuracy	±2μm
Probe Station System (Theta platform)	Travel Distance	±10°
	Resolution	0.0001°
	Repeatability	0.0005°
	Accuracy	0.001°
Wafer chuck	Diameter	310mm
	Surface flatness	±10μm
	Test object size capability	single DUT ,2 ,4 ,6 ,8 ,12 inch
Temperature control system	Temperature controllable range	Recommended operating range -40°C to 100°C, Extended Maximum Temperature Up to 300°C
	Heating and cooling rate	Heating: -40°C to 25°C < 30 min; 25°C to 300°C < 50 min Cooling: 300°C to 25°C < 60min; 25°C to -40°C <60 min