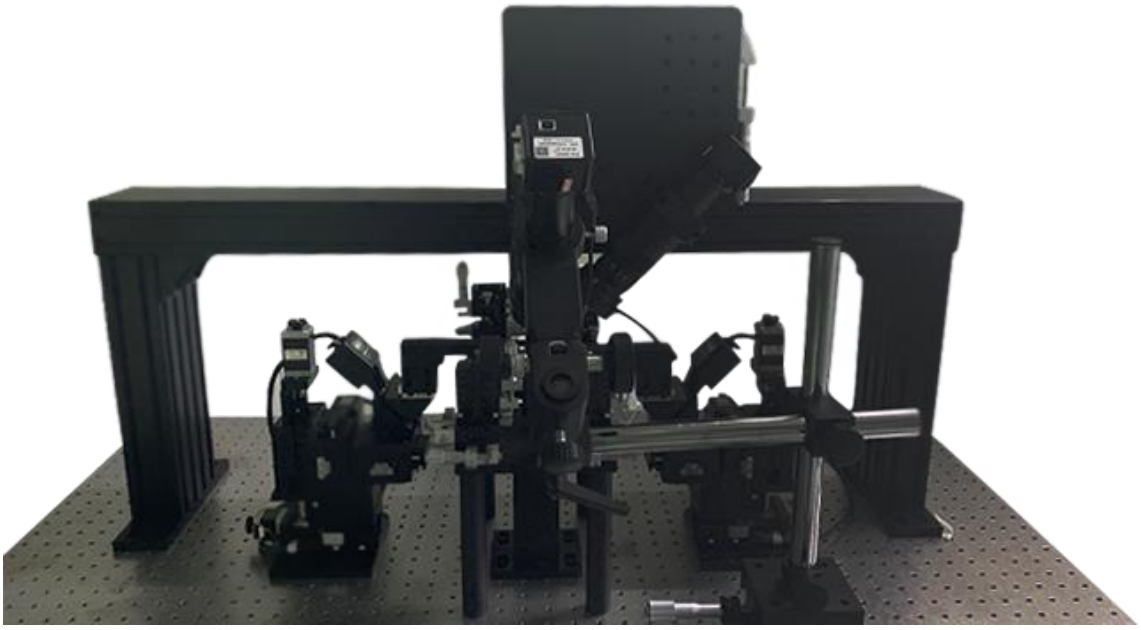
CA-1000 Chip Tester



1. Description

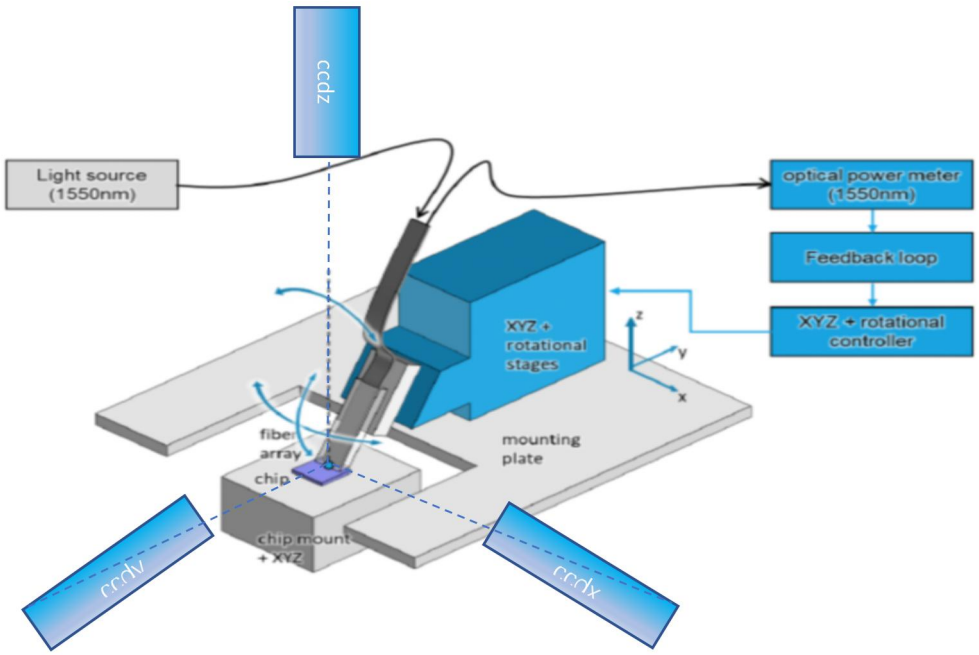
ETSC Sip-Chip/Bar automatic test system covers a variety of chips, including passive and active chips. The system uses required instruments to test chip performance indexes, such as IL, ER, RL FSR, Responsivity, etc. Vision algorithm can realize automatic optical-alignment and probe card contact with pad, without human beings' participation.

The coupling mode includes Grating-Coupler and Edge-Coupler. Response mode could either be optical feedback (power meter) or electric feedback (source meter). Optical-mode the system supports is at least 1.5um, if need be, replacement of motor type can support smaller mode chip test..

etsc

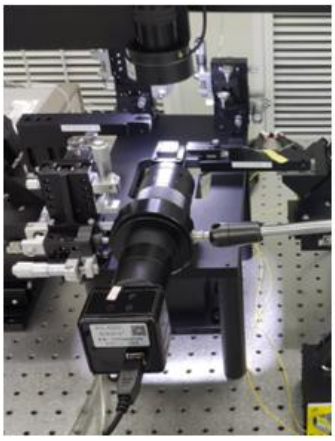
2. Parameter

		X	Y	Z	ThetaX	ThetaY	ThetaZ
Coupling Stage	Travel range	>=30 mm	>=30 mm	>=30mm	>=8 deg	>=8 deg	>=8 deg
	Resolution	<= 50nm	<= 50nm	<= 50nm	<= 0.003 deg	<= 0.003 deg	<= 0.003 deg
	Repeatability	<= 1 um	<= 1 um	<= 1 um	<= 0.02 deg	<= 0.02 deg	<= 0.02 deg
Optical-align time	<10s for single fiber						
	<1 min for fiber array						
Optical-align repeatability	SMF-SiPh variation < 0.2 dB						
Stability	15min < 0.5 dB						
User-Case	1. 2 SMF-Edge coupler 2. 2 SMF-Grating coupler 3. 1 1x4 FA-Edge coupler 4. 1 1x8 FA-Grating coupler 5. Response: Power or PD						

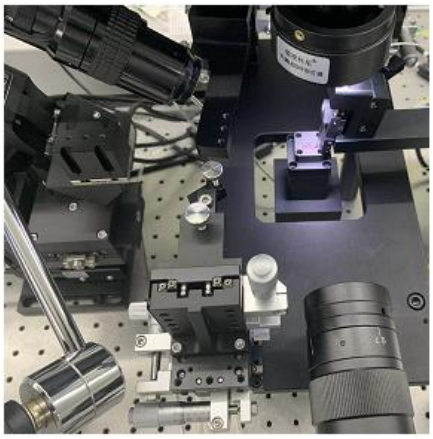


3. Specification Feedback Explanation

- Custom build testing system based on specific customer requirement
- Automation for key steps using image recognition, thus test accuracy and efficiency are greatly improved.
- Accomplishment of the requirements are thru high precision 6 axis stages on pneumatic optical anti-vibration tables thru CCD AI image processing in identifying the rotation center.
- Reach optical peak search capability of < 0.1dB accuracy.
- Typical similar system-built reach AI image position resolution at submicron scale with pixel on micrometer scale. And the actual resolution depends sensitively on the optical material under test.
- Typical similar system-built reach rotation introduced error at submicron scale with center of position error less than a couple of um thru embedded CCD image AI processing for optical alignment.
- Execute a rough alignment in <10 seconds.
- Typical such system will launch optical power less than 5 dBm and for parts net peak loss not greater than 40 dB.
- Include a polarization scrambler to reduce the polarization impacts on alignment accuracy.
- Platform design. Need only a few modifications can be compatible with other types of chip tests.



FA Test for Edge Coupler



FA Test for Grating Coupler

Electric Test

4. Functional Requirement Response

	Requirements	Reply
1	It should be possible to mount the fiber array on the setup under an angle of approximately 10 degrees with the vertical axis.	OK
2	The position of the fiber array must be control labor over a range of 20mm along the 3 axes XYZ	OK
3	The positioning of the fiber array must have a relative control with a precision of 50nm	OK
4	It should be possible to rotate the fiber array along the 3 axes, with an angle of +- degrees to the vertical, and +- 3 degrees to both other axes (roll, pitch, yaw)	OK
5	The center of rotation should be controllable in software so it can be aligned with the end-point of the fiber array. The control of the rotation should be possible around this center and at the same time avoid physical contact with the chip.	OK. Rotation center on FAU thru CCD visual calibration on roll, pitch and yaw
6	Positioning and rotations should be controllable through a feedback loop which measures the optical transmitted power and uses that signal to optimize the position of the fiber array.	OK
7	The active feedback loop assumes the inclusion of an optical power meter which works at 1550nm wavelength.	OK
8	The active feedback loop should be able to execute a rough alignment in <10 seconds.	OK
9	This feedback loop should be able to run continuously to stabilize the optical coupling in the setup. This assumes a temperature stability of 23°C +- 2°C	OK
10	The setup must have the capability to mount multiple types of fiber arrays.	OK
11	The alignment and optical equipment are accompanied by the necessary software and libraries (application programming interface – API) to control the positioning as well as the feedback loops.	OK. Will provide API with user guide manual. Meanwhile, we will provide EXE software with GUI for rotation center calibration, feedback loops, instruments control.