

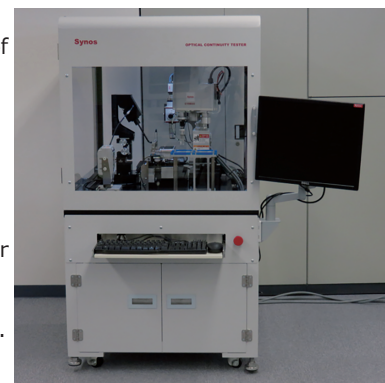
OPTICAL CONTINUITY TESTER

Optical method insertion loss manual measurement system for optical waveguide modules, using optical measurement optics M-Scope type M

Optical Continuity Tester, high speed continuity tester for polymer optical waveguide, is continuity inspection system with high speed and accuracy, to test continuity on each channel of multi-channel polymer optical waveguide and related module. Measuring light batch irradiation and image processing method make it possible to measure continuity of multi-channel polymer optical waveguide at one time. This technology realizes high-speed optical continuity test for polymer optical waveguide for OPCB substrate at mass production.

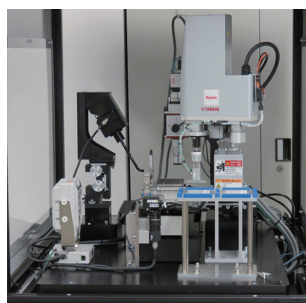
[Features]

- Alignmentless high-speed optical continuity inspection
- High accuracy by dedicated large N.A. measurement optics and high resolution CMOS detector
- Dedicated high speed image processing software developed for **Optical Continuity Tester**
 - Extract, process, and judge only guided wave propagation light of optical waveguide
 - Applicable to waveguide external shape measurement such as core pitch, core position, etc.
 - Various measurement mode such as defocus measurement mode, etc.
 - Supports automation and efficiency of inspection



[Automatic sample loader/unloader mechanism (option for automation support)]

Preparation work for individual pieces sample measurement is greatly reduced, and inspection efficiency and throughput can be greatly improved.



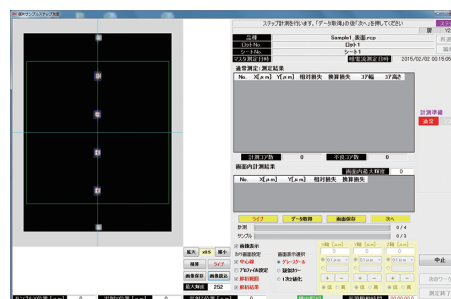
*Automatic sample loader/unloader mechanism



*Sample transfer robot and sample tray for individual pieces sample

[System control/data analysis software for OCT]

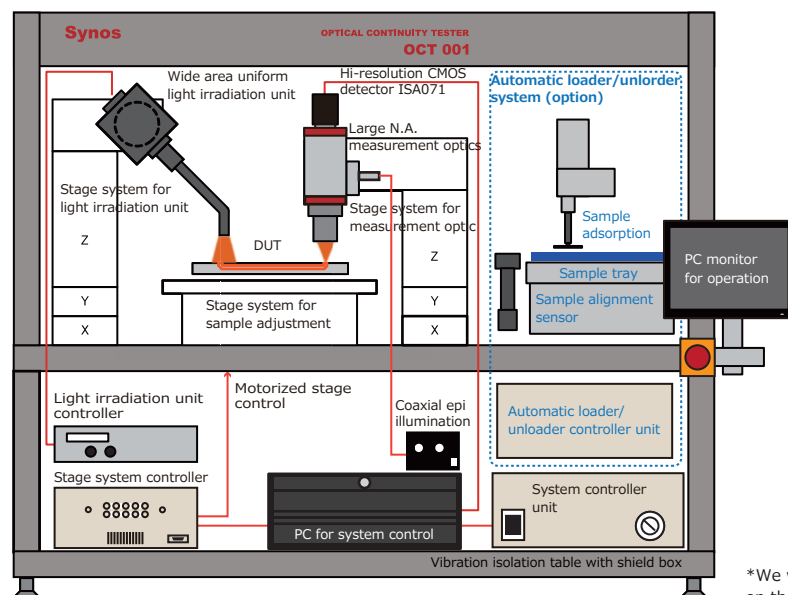
High-speed measurement and judgment of the conduction state of each channel of the optical waveguide are performed by the original image processing analysis.



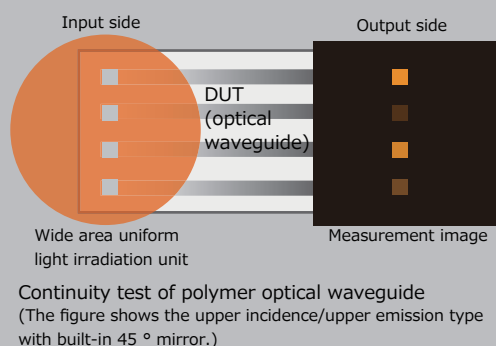
[Optical continuity tester basic specification of main part (light irradiation unit, detection system)]

- Wide area uniform light irradiation unit
 - Output N.A.: 0.57
 - Irradiation size: $\phi 4\text{mm}$ (@gap 5mm)
 - Uniformity in irradiation surface: $\pm 2\%$
 - Center wavelength of light source: 850nm (FWHM: $\pm 40\text{nm}$)
 - Maximum output light power: approx. 15mW
 - Output light stability: $\pm 1\%$
- Dedicated large N.A. measurement optics
 - Detection N.A.: 0.4
 - Optical magnification: $5\times$ (Objective lens $20\times$)
 - Field of view: $1.28\text{mm} \times 0.96\text{mm}$
- Detector (high resolution CMOS detector **ISA071**)
 - Total pixels: 2048×1536 pixels (approx. 3.2M pixels)
 - Pixels pitch: $3.45 \times 3.45\mu\text{m}$
 - Sensor size: $1/1.8$ inch
 - Gradation: 12bit

*We will propose system with various configurations and specifications depending on the measurement sample, specifications, operating method, and budget.



Technical information [Measurement method of optical continuity tester]



In OPCB substrate, light emitting and receiving devices for transmission and reception are mounted on a substrate on which optical waveguide is formed, and signal transmission is performed through conversion of electric-optical-electric signal.

Conventionally, to test the continuity of optical waveguides, it was common to align the optical fiber at the optical waveguide input and output ends, measure the insertion loss of the optical waveguide for each channel, and judge the continuity. However, this method required long time for testing and not suitable for mass production inspection.

Optical continuity tester is the system intended for mass production high-speed continuity inspection of polymer optical waveguides for OPCB substrate.

- Irradiate highly stable and uniform measurement light onto the optical waveguides of multiple channels at once.

- Large N.A. detection optics and high-speed image processing are combined to collectively process and judge the continuity of multiple channels.

With the above method, we have achieved alignmentless method and highly accurate high-speed continuity inspection of polymer optical waveguides.