

## Gigalight Automatic Testing System for Optical Module

### I. Introduction to automatic testing system

Automatic testing system refers to the system that equipment automatically conducts processing, measurement, display and storage and outputs product testing results through computers and various communication buses under the minimum human intervention; the system has the integration of instrument technology, bus technology, computer, even database application and other technologies. Compared with the manual operation mode, the automatic test can save time and effort and improve labor productivity and product quality. The rapid development of computer technology and instrument technology makes the automatic testing system become a trend and tide in testing and measurement industry. In the manufacturing link of optical component industry, the product test needs to be supported by a lot of expensive equipment and experienced personnel, so the foreign-invested enterprises always complete the product test relying on automatic testing systems in consideration of high labor costs and product quality demands; in recent years, the product test of some domestic enterprises have been changed to automatic test gradually due to gradual rising labor costs and needs of various internal and external factors. Compared with manual test, automatic testing has obvious advantages in the following aspects:

During manual test, each module exists in isolation and achieves a single function, which results in a large number of testing processes for optical modules. An operator can only operate or observe that a product test is conducted by a set of equipment of a process at the same time and a lot of manpower shall be input to complete all the tests. Product test demands and instrument resources are integrated and optimized and also the testing processes are integrated by the automatic testing system, which can greatly reduce the investment of human resources and dependency on skilled employees.

#### ✦ **Efficiency**

Process optimization and integration is the root of efficiency improvement. The testing system can run automatically, save instrument operation, data logging and other manual operation links and make that a person can operate multiple machines become a reality.

#### ✦ **Fool proof and product consistency**

The diversity of product model leads to different debugging and testing specifications; in actual operation process, human error is often difficult to avoid and even leads to unexpected risks; the products of same model may have very different product debugging and testing results due to different operators and techniques; the consistency of product performance cannot be reflected. Automatic testing system can determine the testing results, save the testing data and increase the fool proof effect of process and consistency of product automatically by calling the unified configuration documents.

➤ **Utilization rate of equipment**

Optical communication testing equipment is often more expensive; a lot of training shall be conducted for operators in order to make them use the equipment properly. During manual testing, the knobs and buttons on the control panel of instrument need to be debugged, which potentially increases the daily wear of equipment; the common buttons are used for more than 200,000 times/year, for example, some buttons of many Agilent oscilloscope mainframe of our company have different degrees of damage and even failure. Automatic testing system can be operated without frequent manual contact, which can greatly reduce the opportunity to bring damage and wear to the equipment. In addition, the efficiency improvement brought by automatic testing has directly enhanced the throughput capacity of testing equipment and reduced the equipment investment.

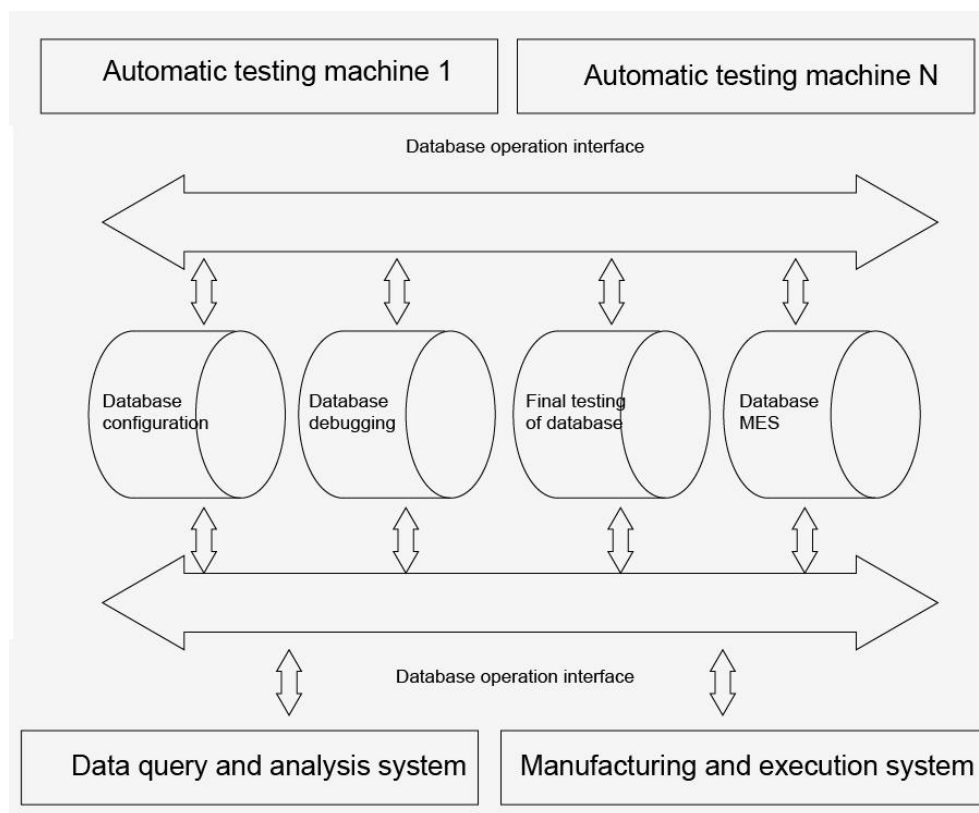
➤ **Data retrospect and analysis**

During manual testing, the testing data shall be recorded manually, so the equipment is idle at this moment, which makes the equipment be time-consuming and error-prone; if you want to achieve traceability requirements, arrangement and archiving for large amounts of data are tedious, not to mention data analysis. Automatic testing system can automatically save the testing data, realize product traceability requirements easily, and also provide simple ways to make scientific decisions through product data analysis.

## II. Automatic Testing System of GigaLight

Since 2012, we have made adequate demand investigation for testing status of various production lines of company and also developed a series of automatic testing systems meeting stage demands of production line by using existing equipment resources; the testing of passive PLC, MEMS-VOA, AWG&DWDM and active components, common photoelectric module and integrated optical module product are all within the capacity of these automatic testing systems. The solution for active optical module testing system is introduced generally as follows:

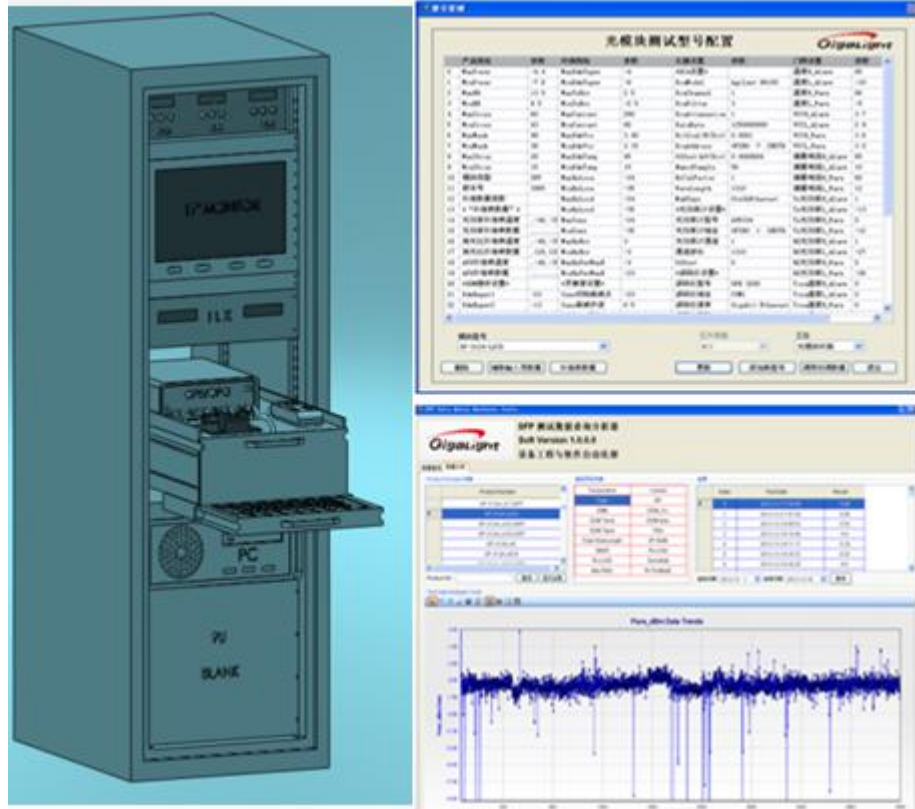
### ✦ Modeling and data flow methods



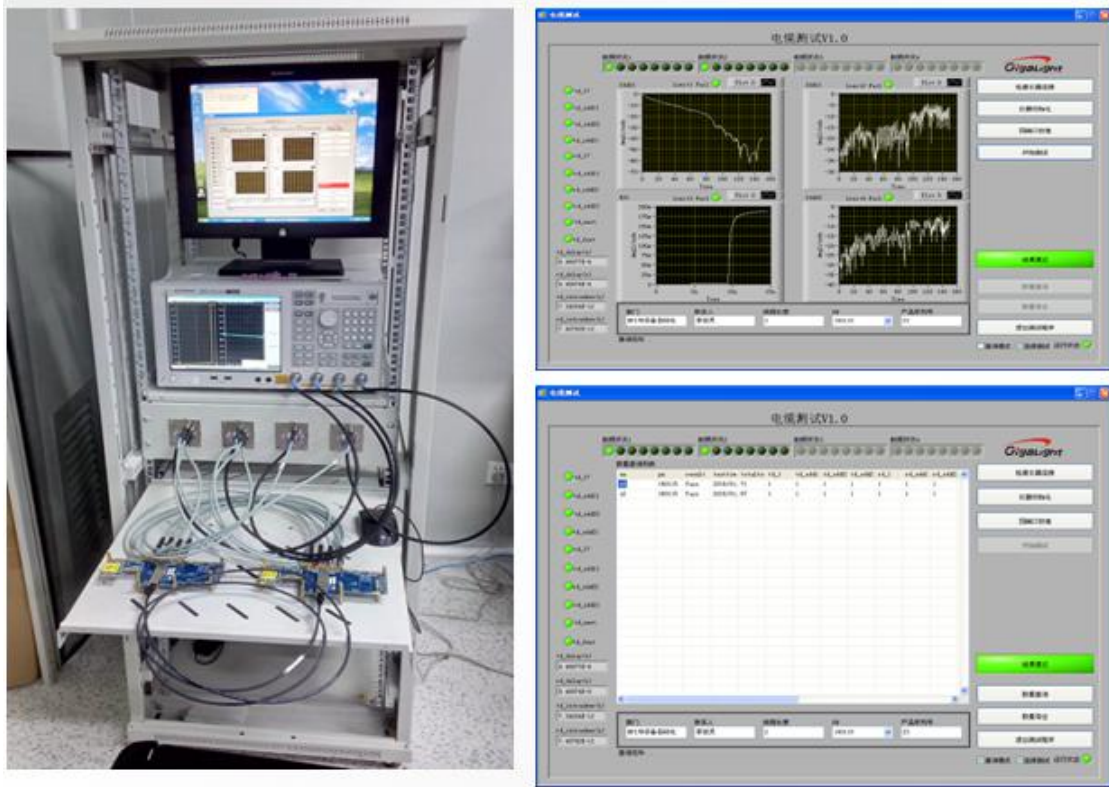
In the whole active optical module testing system, the configuration program module, main program module of automatic testing and data query and analysis program module are included. Engineering technical personnel can configure the instrument selection, product plan and testing method one by one and also save them in the database through a good user interface in advance so as to adapt to testing of different plans and different types of products; employees only need to input product model and serial number information and the main program of automatic testing can automatically call configuration information to complete the whole test and save relevant data in the database; the data

query and analysis program module provides the capacity of data analysis and retrospect and engineering and quality personnel can not only summarize historical data trends through the system, but also query individual data. In addition, the effects from individual product tracing to material batch effect analysis can be reached by combining with the manufacturing execution system (MES).

➤ **Automatic testing machine**



2 Automatic testing system for optical module



3 PCC CABLE automatic testing system

### III. Follow-up Prospect

From the common active optical modules of company, the automatic test system has achieved the purpose to cover most of product categories and the same testing machine has met the fast switching of single-fiber, dual-fiber, multi-module, single-module and other products. At present, the accumulated testing data of various machines of automatic testing system has exceeded 4000K and the whole system has been reliable and agile; the original irreconcilable contradictions between efficiency and quality have been solved and the solid foundation has been laid for the intelligent closed-loop control of various processes of company's product line; in the following time, we will continue to increase the development and promotion of automatic testing in various product lines of company, provide products with more cost-performance advantages to clients and make greater contributions to services.