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MIT

Automated Fiber End Face Inspection System

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Automated Visual Inspection Tool for Fiber End Face Inspection

A fully Automated Visual Inspection Tool, the AVIT automatically locates, images, and inspects the surfaces of fiber end faces to detect scratches, pits, chips, cracks, loose contamination, and other defects.

Optimized for in-process and final inspection stages of manufacturing of cables, circuit boards and small and large modules, the AVIT provides highly reliable, consistent fiber inspection and user flexibility in test specifications with detailed, auditable documentation of results.

The AVIT inspects all the fibers within a large (up to 600 by 250 mm) inspection area, significantly reducing labor time to inspect and rework any fibers that fail the inspection criteria. Part specific custom fixtures may be fitted to the system for testing customer specific parts. Standard fixtures are available for a variety of standard cable types, such as MPD, MT ferrules, various Molex MT array and circular connectors. Optionally, the AVIT can perform continuity testing on products and cable assemblies.

By automatically and precisely inspecting each fiber end face, the AVIT enables companies to efficiently ensure the quality of each fiber in all of their products using less labor.



AVIT in Production Clean Room

Features

The AVIT provides unparalleled functionality to inspect fiber end faces cost-effectively, reliably and accurately providing the following partial list of features:

Automation - The three-axis motion system and vision platform are designed to accommodate tolerances in both the fixturing and Unit Under Test (UUT). Dual camera system enables image capture of the entire ferrule and rapid localization of fibers in multiple fiber connectors.

Ease of Use - Software ease of use is provided by the panels for monitoring, configuring and viewing the results of the inspection. The Main Panel (Figure 1), for example, provides a graphical presentation of the overall test status for all parts and fibers currently under test, as well as ferrule and fiber images. Hardware ease of use is provided by quick changeout fixtures and simple load/unload of parts within the fixtures.

Fixtures - The AVIT accepts part specific fixtures that provide the mechanical interface between the AVIT and the UUT. PVI has significant experience designing custom fixtures that are extremely easy to use, while providing operator independent, repeatable measurements.

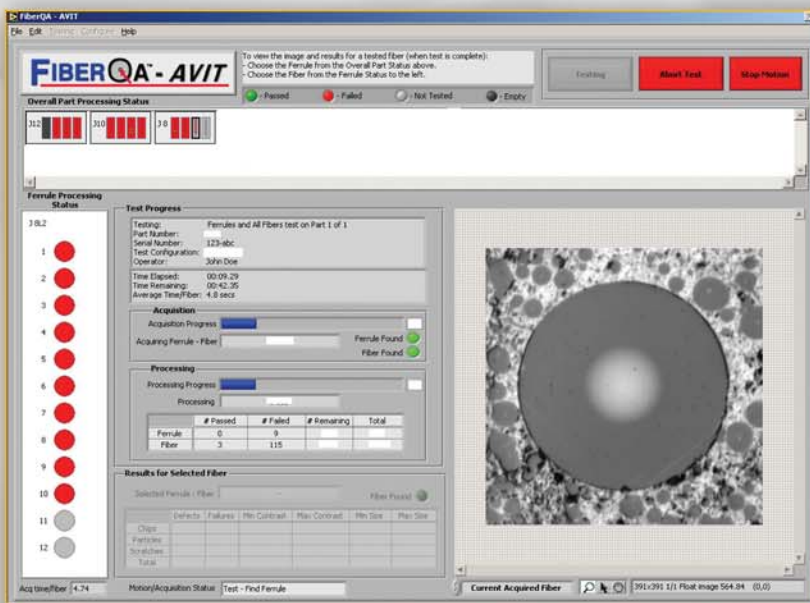


Figure 1: AVIT Main Panel During a Test

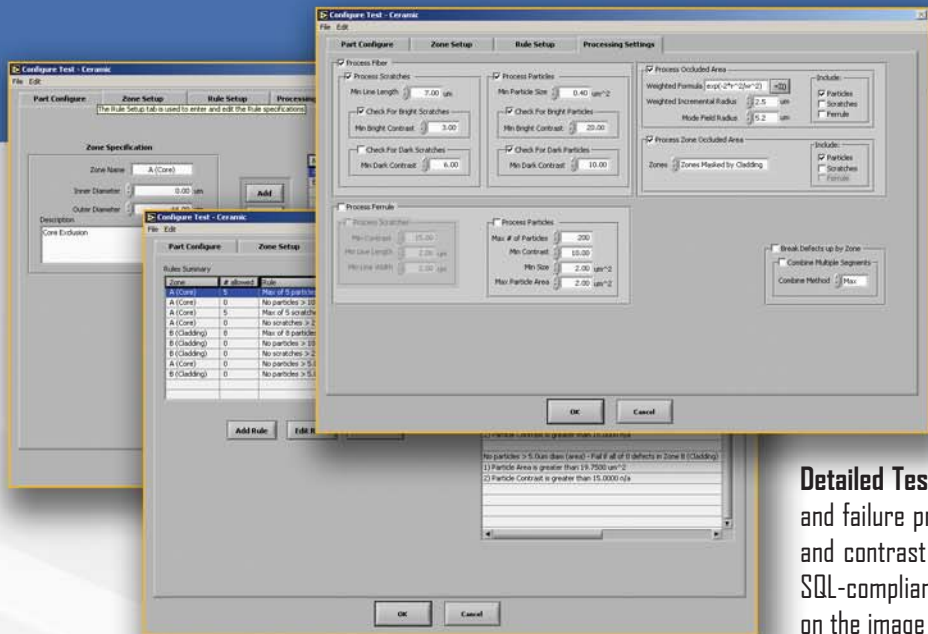


Figure 2: Inspection Criteria Panels

Inspection Criteria - The software has predefined industry standard test parameters, such as IPC 8497-1 and enables customers to implement company-specific testing parameters. Test parameters, defined using the Test Configuration panel (Figure 2), determine which defects are detected and what constitutes pass or fail.

Detailed Test Data - Pass/fail statistics and detailed defect and failure properties (such as size, location, occluded area, and contrast of each scratch and particle) are stored in an SQL-compliant database. Intuitive review using defect overlay on the image from the stored images and results.

Data Management - AVIT Reports is an optional application that provides a rich set of post-processing and reporting tools aimed at reducing engineering and production management time, while maximizing visibility into the process data. Provides access to the data and images stored by all AVIT systems accessible via the company's network.

Occluded Area Metric - PVI Systems pioneered the metric of Occluded Area, which computes the total area of defects on the fiber end face. Studies show that the total occluded area is directly correlated to the optical properties, such as insertion loss, of a mated connector.

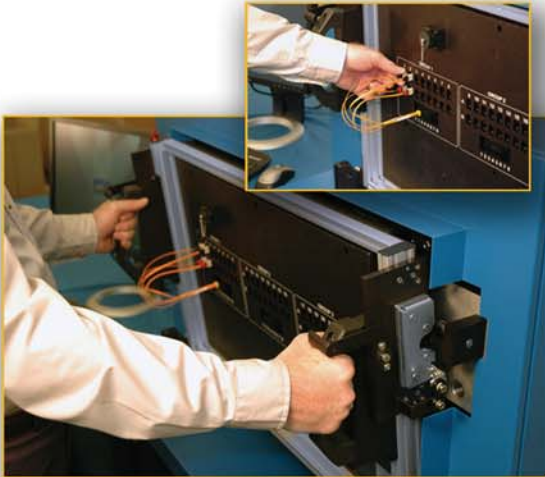
Benefits

Cost Savings - Customers save direct costs by reducing the required number of inspectors by automating testing of products and cable assemblies.

Accurate, Quantitative Results - AVIT inspection is more accurate and repeatable than human inspection. Quantitative defect and failure data and images are stored for review and process analysis.

Reduced Operator Time - Operators are required to load and unload the parts and enter basic part information into the system. This typically takes a couple of minutes, freeing the operator to perform other tasks while the system automatically performs the inspection.

Reduced Supply Chain Friction - Supply chain friction is minimized by documenting fiber quality at each point in the supply chain, using a repeatable and reproducible inspection process.



AVIT Load/Unload

Equipment Size	Unit is 44"W x 28"D x 57"H (excludes PC, monitor, keyboard and mouse)
Equipment Weight	300 lbs.
Inspection Area	Up to 600 mm x 250 mm (optional fixture elevator adds 300 mm vertical)
Throughput	Up to 4 seconds/fiber
Working Distance	Can inspect ferrules up to 25 mm deep inside connectors
Power Requirements	110 VAC, 15 A
Ferrule Camera Resolution	Ceramic Specific Unit: 5 μm/pixel MT Capable Unit: 15 μm
Fiber Camera Resolution	0.4 μm/pixel, with optional high resolution of 0.27 μm/pixel
Cleanroom Specification	Class 1000
Warranty	One year on parts & labor

About PVI

PVI Systems is an engineering design group who solves our clients' toughest problems in test and automation, from R&D to Production. We accomplish this through consulting and design services and development of custom instrumentation solutions, which include vision inspection systems, automated test and measurement equipment, data acquisition systems, and factory automation.

Our staff has provided cost effective, well-designed systems to both large and small companies. Our creative solutions, using cutting edge test and measurement hardware development and software has enabled our customers to build better products, conduct faster research and reduce the cost of test.

PVI Systems is a well-respected member of the National Instruments Alliance Program at the Certified Alliance Member level.

Manufacturing engineers look to PVI Systems for reliable, accurate, and flexible custom test solutions.

For more information on the AVIT, PVI Systems' other products, or services, please contact us:

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