PDF/SOLUTIONS[™]

Exensio[®] Test Operations

Test Data Connectivity, Quality, Control, Edge Compute and Analytics for IDM and **Fabless Semiconductor Companies**

Overview

The suite of Exensio[®] Test Operations modules enables Fabless and IDM companies to securely collect and manage test data, assure high outgoing quality, deploy machine learning to the edge, establish controls around the test process, and improve efficiency across their manufacturing supply chain.

Machine Learning and Next Generation Test

Advanced and multi-chip devices increasingly require multistage quality grading, data feed-forward and machine learning screening techniques.

Test Operations offers Machine Learning Operations ("ML Ops") capabilities enabling customers to effectively train, deploy and manage machine learning models at the edge and to feed requisite data where needed.

Advantest ACS Edge[™] Applications

PDF Solutions provides standalone ACS Edge applications in the Advantest ACS Solution Store, and additionally offers a feature rich Exensio integrated ACS Edge container providing customers a way to easily deploy custom models with data feed-forward and model management.

Test Process Control and Quality Control

Quality rules allow customers to prevent test escapes due to illogical device binning, measurement exceptions, undertested devices, invalid ECID, consecutive binning, and stuck unit scenarios.

Process rules continuously monitor the real-time health of production for excursions in yield, bin, site-to-site, statistical performance, measurement statistics, and WECO SPC limits.

Product Highlights

Machine Learning and Edge Deployment

- Model training and deployment automation
- High performance synchronous model execution
- Bring Your Own Model (BYOM) with Exensio integration
- Data feed-forward

Test Process and Test Quality

- Test quality and escape prevention rules
- Rule simulation and distribution to test facility
- Online and offline rule execution

Product Quality and Reliability

- ML model based and statistical outlier screening
- Inline and post-process outlier detection
- Custom rules

Test and Operational Efficiency

- Adaptive test flows
- Probe card layout and route optimization
- Test cell setup automation and advanced prober control

Data Collection and Management

- Low latency secure data transport
- Wafer map management and editing
- Scalable test data storage and retention

Analytics

- Guided Analytics
- Advanced test data analytics and reporting
- **Operational Equipment Efficiency (OEE)**

Exensio® Test Operations

Quality and Reliability

Test Operations enables customers to achieve high outgoing quality through post-process outlier detection for wafer sort and inline outlier detection for package test. Mechanisms include typical statistical and spatial algorithms (e.g., DPAT, ZPAT, GDBN, NNR, ...), as well as more advanced machine learning based mechanisms.

Operational Efficiency

Customers may improve their test efficiency through a combination of analytics, adaptive test and advanced prober control. Exensio analytics enable customers to understand failure modes, optimize retest plans, improve equipment utilization (OEE), and define adaptive test plans to dynamically alter test program flow to test-more / test-less based on actual test results and/or predicted die quality.

Data Collection and Management

Exensio Test Operations typically collects data directly at the test equipment in real-time and comprehensively represents all test insertions, retest operations, and tester activity to provide customers with enriched time sequenced data.

Data can be securely routed through PDF Solutions' Data Exchange (DEX) Network from the source to the customer's Exensio analytic platform and, optionally, feed-forward to the site of subsequent test operations.

Test Operations Analytics

Test Operations shares the same powerful backend data store options and user interface of the Manufacturing Analytics module. Customers can customize, enhance and/or develop their own analytic content and reports.

Deployment

Test Operations supports a broad range of current and legacy tester platforms and can be deployed to customers' internal and outsourced test facilities.

Exensio Analytics Platform

Test Operations is one of four complementary modules in the Exensio Analytics Platform.

Customer Value — Cost, Quality, Throughput

Capability	Cost	Qual	Thru
Machine Learning Operations Train, Deploy, Manage, Monitor, Data feed-forward		✓	
Test Process Control Rules Yield, Bin, Site-to-Site, SBL, SYL, SPC, WECO			
Test Quality and Escape Prevention Rules Stuck unit, Meas. exception, Mis-binning, ECID	✓	✓	
Adaptive Test Flow control, Test-more / Test-less, TTR			
Outlier Detection DPAT, ZPAT, GDBN, NNR, Freq. dispersion, Spatial, ML		✓	
Equipment Efficiency (OEE) Tester utilization, Rate efficiency, Operational efficiency			
Advanced Prober Control Setup validation, Touchdown rules, Retest optimization		✓	
Yield Optimization and Loss Avoidance Identify fail mode, Prevent false yield loss, Optimize retest			
Real-time Data Collection at Tool Single source, Granular, Time sequenced, Reliable transport		✓	

Rule / Model Management



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