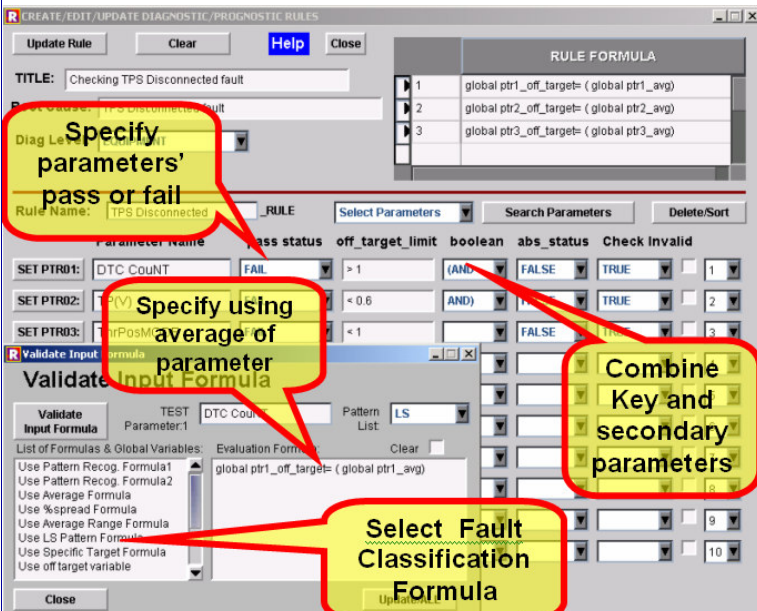




Prognostic/Diagnostic Health Management (PHM) System

A Wafer Electrical Test Knowledge-Based Diagnostic System

Quality Wise Knowledge Solutions



- “Customerized” diagnostic report to your specifications
- Emailed to engineers and management
- Easy to read report structure
- Consistent format
- Capable of supporting multiple processing technologies by invoking different diagnostic rule systems.

1) 2H568500dat;1 WAT Fail Root Causes Summary

Symptoms	Wafer IDs
DVXL16 uniformity problem	1
Unknown RC-PMOS root causes	1

Report Root Causes symptoms in a tabular format.

Failed Wafers ID	Passed Wafers ID	Good Wafers ID
1	13	6,18,25

Out of Spec WAT Parameters

Failed Wafers ID	Failed WAT Parameters
1	RSP, IRL16, DVXL16, RCM1P, RCM1BD, RCM1N,

WE Rules (1 OR 5) Violation WAT Parameters

WE(M)	Violation WAT Parameters
ID10G0N055, VPTN055, BVJN055, ID10G0N06, VPTNW06, BVJNW06, VTNI10, VPTNFTP95, VTNWFTP95, ID10G0PD65, VPTPD065, BVJPD065, VTPDFTP21, VTPDFTP21, RSN,	RSP, VTL16, IBB4G0L16, DVXL16, BVDGOXN, RCM1P, RCM1BD, RCM1N, RCM1M2, BRM1, BRM2, BRPL3_ARY,
WE(S)	Violation WAT Parameters
VTNI10, RSP, RCM1P, RCM1BD, RCM1N,	

Out of Control WAT Parameters

Lot ID: 2H568500DAT;1 --> THERE ARE NO PROBLEMS FOUND IN THIS LOT. SHIP THE LOT.

- Easy input GUI form
- Immediate testing for rule changes
- Save and reuse rules
- No information lost
- 24/7 monitoring

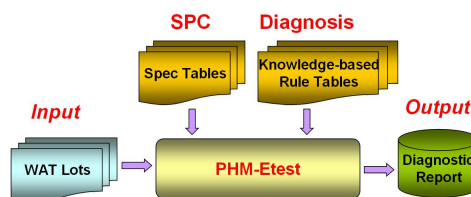
Our patented product is the first Knowledge Management system for semiconductor manufacturing. With our easy to use GUI, FAB WAT engineers can easily enter the WAT disposition rules into the system to generate real time detailed diagnostic report with root causes for failure symptoms and mechanisms.

Our product provides a “Customerized” Knowledge Management System for semiconductor manufacturing to obtain, utilize, store and share WET disposition knowledge and information.

- Results are Emailed to engineers and management for collaboration and corrective action.
- Disposition knowledge is retained.

Increase Your Knowledge At Work!™

PHM-Etest System Flow Diagram



Contact us today to start having the QWiKS PHM system do the work so you can enjoy higher yields and customer satisfaction.

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PHM (FCS) Failure Classification System

FCS Features

- Report, save and share product anomalies.
- Collaboration tool between engineers, management and fabs.
- Identify root causes and corrective actions to eliminate problems before they happen.
- Generate weekly, monthly and quarterly reports.
- Easy data entry GUI pages.
- Add SEM or other photos to your report.
- Create new rules from parametric signatures.
- Track and report continuous improvement efforts
- Your company information saved on your company servers.

PHM FCS contains 5 sections that are used to save, share, discuss, and report product anomalies. GUI pages with fill-in fields and pull-down menus, makes FCS an easy way to accomplish this reporting task. FCS makes collaboration between engineers, management and different FABs to discuss and solve problems a breeze. Whether it's who, what, where, why or when, FCS lets you save that information. All this information can be displayed in weekly, monthly or quarterly reports, by failure category, how corrective actions are reducing problems. FCS is an important tool for tracking the progress of FAB yield enhancement. Contact us today to start having the QWIKS PHM system do the work so you can enjoy higher yields and customer satisfaction.

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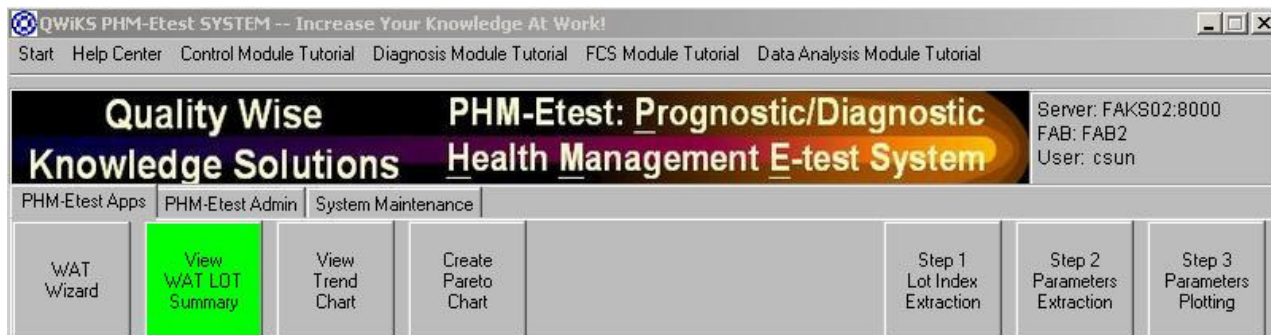
Our PHM system gives you a 24/7 engineer working to find and fix your yield problems



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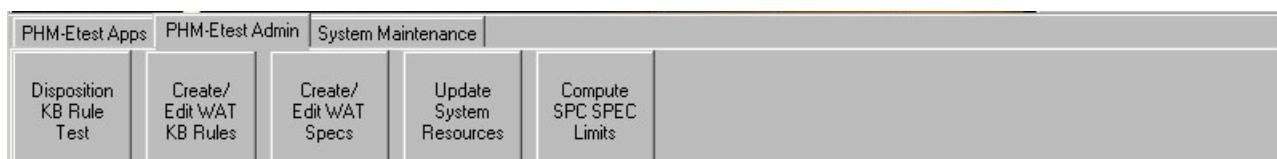
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PHM System Functions



(1) FAKS Application Panel:

- (I) WET Wizard: Click this button to generate WAT diagnostic disposition summary report.
- (II) View WET LOT Summary: Click this button to enter Lot Summary and Data Analysis Graphic system to generate boxplot, trend chart, probability plot and wafer maps.
- (III) View Trend Chart: Click this button to view the pre-saved Product Trend charts.
- (IV) Create Pareto Chart: Click this button to generate weekly or quarterly pareto charts.
- (V) Use the last three buttons to generate Lot Trend charts for WAT parameters.



(2) FAKS Administration Panel:

- (I) Disposition Rule Test: Click this button to select the lot and rule to test and adjust the disposition rule attributes such as the range of off target limits for the WAT parameters. Boolean logic relationship between primary and secondary WAT key parameters specified in the rule table.
- (II) Create/Edit WET Rules: Click this button to build WAT disposition rules by filling a simple form.
- (III) Create/Edit WET Specs: Click this button to add new device and device's spec limits into the system.
- (IV) Update System Resources: Click this button to update/synchronize system tables, knowledge base system and spec tables to other FAKS servers specified in the System Resource table.
- (V) Compute SPC SPEC Limits: Click this button to generate the required specs limits (i.e. valid low/high limits, spec low/high limits and control low/high limits) for automatic WAT disposition.



(3) FAKS System Maintenance Panel:

- (I) System FTP Source Setup: Click this button to setup the username and password required for FAKS server farm synchronization.
- (II) Data FTP Source Setup: Click this button to define the Data source such as data server host name, data directory name, username and password to retrieve the data.
- (III) Spec File FTP Source Setup: Click this button to define the Device's spec file source such as computer host name, spec file directory name, username and password to retrieve the device spec file.
- (IV) System Resource Setup: Click this button to enter the FAKS server farm system information for server to server database synchronization.
- (V) Object Explorer: This function provides equivalent or similar capabilities of file management under Window operating system. Use this function to transfer/retrieve tables or directories to/from other servers.
- (VI) Database Admin: This function provides database synchronization, add or delete data records from the database.
- (VII) Setup Remote FAKS servers: Use this function to update/synchronize a new or existing FAKS server system.
- (VIII) Shutdown Remote FAKS servers: Use this function to shutdown remote FAKS servers.

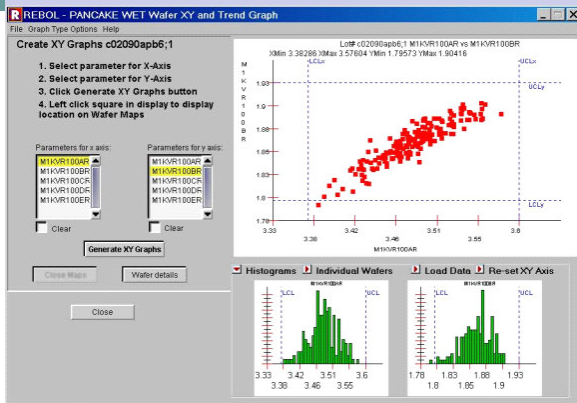
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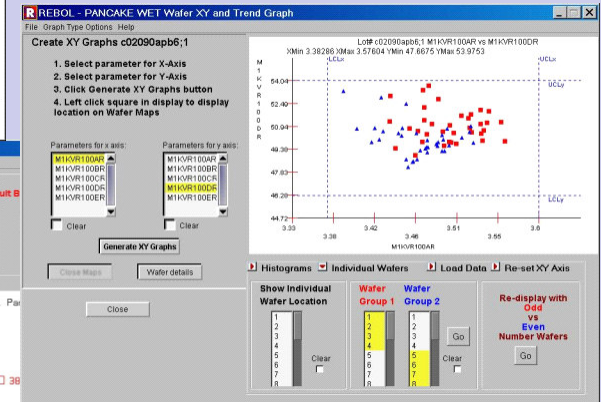
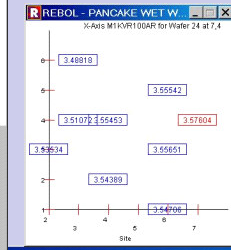
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PHM

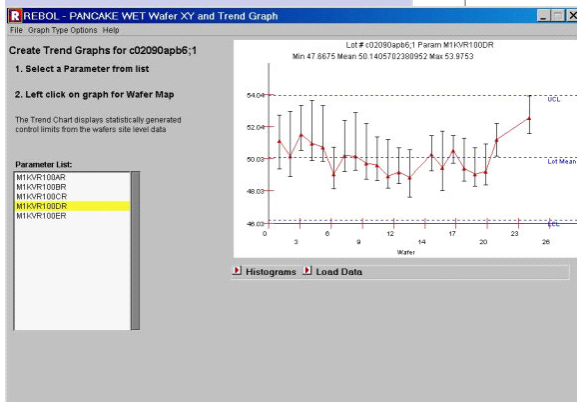
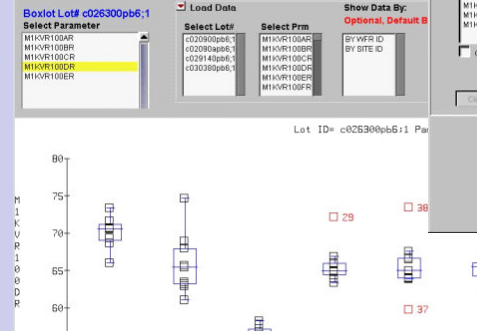
Graphics Package



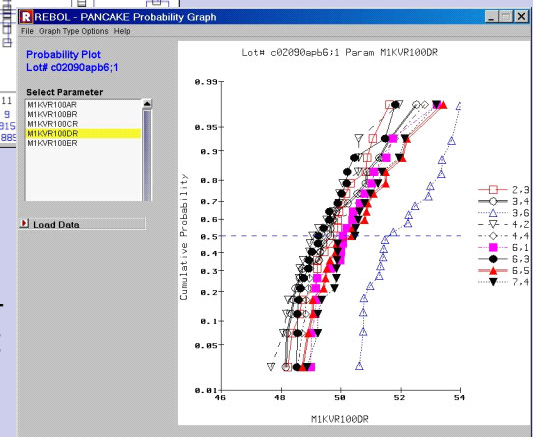
An addition to the patented diagnostic tool and the FCS system, FAKS Graphics Package will allow to visualize your WET data in several familiar formats. Scatterplot with histograms, wafer grouping and WET wafer maps built in. Trend Charts, Probability Plots and Boxplots round out



the suite of visual aids that PHM provides. Load other WET lots data from any of the graph windows. You can save any of the graphs for viewing later and retain full drilldown capability. Just point and click data



points for additional graphs and tables. WET wafer maps show the wafer location of the data point selected. The wafer details option shows you by site location



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Visualize your data today.
 Contact QWiKS at:
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It's your data and you need to see it.
 Increase Your Knowledge At Work!TM



Prognostic/Diagnostic Health Management (PHM) System Product Features

Quality Wise Knowledge Solutions

Faster WET analysis. 24/7 monitoring. Auto Diagnostics and Auto Lot Disposition. You get it all with PHM Knowledge Management (KM) system. Keep and re-use your company's expert knowledge using our patented technology. Your engineering staff will be able to spend more time preventing problems by spending less time finding them.

Better vs. Breakthrough

Customer Yield-acceleration Solution	Productivity/Efficiency	Customer Yield-acceleration Solution + RT KM
30% improvement in analysis time	→	5 mins root causes analysis
Determine source of defects and process excursions	→	Real time 24/7 monitoring
Root cause analysis software	→	Auto diagnostics Auto Lot Disposition
Capture, retain, and share Best Known Methods	→	Re-usable knowledge for continuous improvement

Keep and re-use your company's expert knowledge using our patented technology. Your engineering staff will be able to spend more time preventing problems by spending less time finding them.

The faster problems are discovered, the less product will be scrapped. This means additional revenue, higher yield and better profit margins for your company. PHM pays for itself in just a few months

Early Signal Catching

	Response time*	Impact wafers
In-line monitor	Real time ~ 4hrs	More than 25 pcs
WAT monitor	4hrs	More than 80 pcs
W/S monitor	12hrs	More than 250 pcs
FA feedback	1 day ~ unknown	More than 500 pcs

* Response time: Excursion happened to root cause found out

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The screenshot displays the QWiKS PHM E-test Lot Summary Page. It features a navigation bar with icons for Loss Report, FCS Photo Gallery, Parametric Signature, Module Review, Corrective Action, Feedback & Requests, Archive FDS To database, and View FDS in Excel. Below this is the WAT Parametric Signature Page, which includes a text area for parametric signatures, a 'Create Disposition Rule' button, and a 'Save Parametric Signature to database' button. At the bottom, there is a table of parameters for Lot number 2H568500dat1 Wafer 00.

	PARAMETERS	R&P	IRL16	DVxL16	RCM1P	RCM1BD	RCM1N	
1	% FAIL	80 %	80 %	80 %	100 %	80 %	80 %	2H56
2	AVG	*H811	*L7.9908	*L0.52	*H80157920	*H2997240	*H3402546.6	wafers
3	STD	899.167004	17.114936	0.76	1.118613e+08	4366935.073	4652727.418	6577
4	% SPREAD	114 %	214 %	146 %	140 %	146 %	137 %	
5	% OFF_TAROET	205 %	-79 %	-75 %	3816944 %	1089905 %	660599 %	
6	USL	300	60	2.9	4000	500	1000	
7	UCL	250	48.75	2.425	3050	387.5	757.5	

Below the table is the WAT WIZARD TOOLS COMPUTE SPC SPEC LIMITS section, which includes fields for DATABASE (EATEST), DIRECTORY (7FAB2_9577), and various algorithm options (BOK PLOT2, BOK PLOT, QWIKS).

Creating disposition rules is a snap with our 1 button solution by using known parametric failure signatures. PHM also provides an easy to use GUI for developing disposition rules. Our system allows you to generate Spec ans SPC limits quickly and easily using your historical data. PHM does the work and you enjoy higher yields.

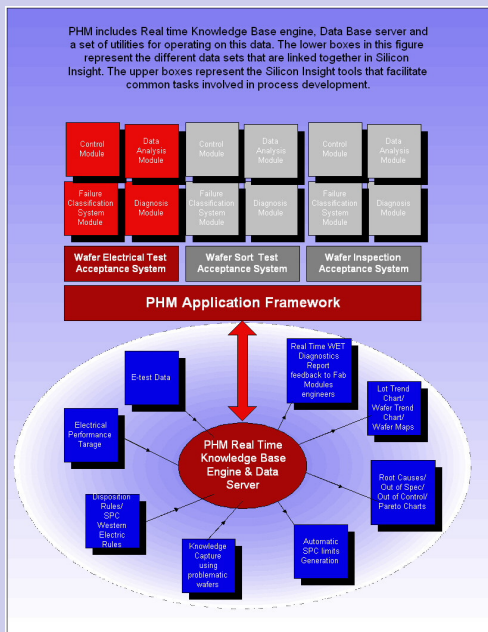
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PHM

Design and Road Map

The PHM roadmap incorporates Knowledge Management at three primary locations. In the production flow. The Wafer Electrical Test (WET) acceptance System produces In-Line, Real Time analysis and feedback to identify process problems to root cause in only a few minutes. The Wafer Sort Test Acceptance System will quickly identify process

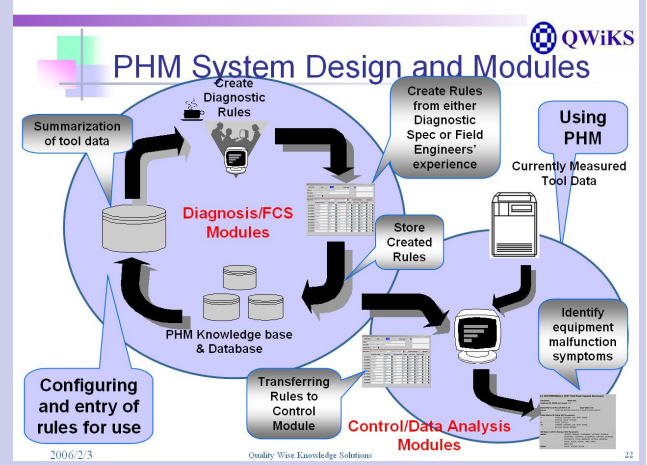


problems that affect product yield and performance. The Wafer Inspection Acceptance System identifies problems related to process defects.

PHM has been specifically designed as an add on layer to existing legacy systems.

Whether your company has in-house developed analysis software or third party analysis software, PHM will act as an early warning system so your engineers can continue in-depth analysis using software familiar to them, thereby reducing the learning curve.

The FAKS system design allows you to easily create, store and re-use disposition rules. You may either create rules from known problematic wafers or generate rules from the easy to use GUI. The rules are stored in the PHM database for checking new material in-line and in real time. As electrical test results are delivered to PHM, those results are instantly checked against the stored rules by the Control/Data Analysis Module. The output of this operation generates a diagnostic report which is Emailed the fab engineers and their respective management so everyone is in the loop. The diagnostic report includes details on failing wafers for Western Electric rules, out of spec and out of control parameters. The Lot Disposition report is also generated so the operator can pull wafer from the lot. Scrap the entire lot or send the through as a result of the disposition findings. This feature allows product to flow through the system faster and more efficiently.



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