



6 Uses for Examiner at Wolfson Microelectronics

Wolfson Test Challenges

Wolfson is a global provider of high performance, mixed-signal integrated circuits for the digital consumer electronics market.. The company's portfolio of products generate outstanding sound quality and increased performance for a whole host of exciting devices including MP3 players, mobile phones, PDAs, digital cameras, DVD players and high-end audio systems.

Wolfson specializes in advanced analog and data converter products for audio, video and communications applications.



As a high volume fabless semiconductor company, Wolfson outsources manufacturing and test operations to several fabs and assembly/test subcontractors around the world. In the cost-sensitive world of consumer electronics, maintaining high yields is critical to Wolfson's success. Consequently they closely monitor the yield of every lot of devices, promptly investigate excursions when they arise, and monitor long term trends for each supplier and part type. In 2003 Wolfson selected Galaxy's Examiner software as the primary software platform for all of its yield management and test data analysis applications.

6 Phases of Test Data Analysis

Wolfson's product and test engineers rely on Examiner for six distinct phases of their product lifecycle, including:

1. Device characterization
2. Test program qualification
3. Release to manufacturing
4. Yield-loss monitoring and diagnosis
5. Ongoing yield improvement
6. Wafer sort yield analysis

Device Characterization

In this phase of product development Examiner is used by Wolfson's product engineers to analyze in-depth characterization tests that are performed over various supply voltages and temperatures.

Test Program Qualification

Wolfson test engineers then use Examiner to validate the stability of their test programs and adjust test limits prior to manufacturing release.

Release to Subcons

In this critical phase, Wolfson uses Examiner with a set of "golden" reference devices to measure the correlation across testers and across multiple subcon sites. This step is performed whenever Wolfson releases a new program or load board. Upon successful completion of this correlation process the subcon is given the go-ahead for volume production.

Yield-loss Monitoring and Diagnosis

On a daily basis Wolfson downloads the STDF files from their subcons around the world and checks each lot for overall yield. If yield falls below a designated threshold they generate a detailed report with Examiner and compare yields from other lots, load boards, testers, etc. until they identify the likely cause. False failures are not uncommon, and can sometimes be traced to timing problems in test programs, tester-tester variations, and load board issues.



Ongoing Yield Improvement

Wolfson conducts a monthly “yield improvement forum” that monitors yield trends for each product, and prioritizes yield improvement activities. The basis for this forum is an Examiner report that is automatically generated as a batch operation using CSL, the built-in scripting language. Since these reports require a massive amount of historical data, Examiner must analyze 10GB or more of test data at a time, a task which it typically completes in 2 hours or less.

Wafer Sort Yield Analysis

Based on the success with final test data, Wolfson’s wafer fab engineering group has also started to use Examiner on a few select devices for which wafer sort is also performed. Both electrical test and functional test data are loaded into Examiner for yield analysis.

Benefits of Using Examiner

With the help of Examiner Wolfson has been able to resolve countless problems with their manufacturing and test process. Key among them has been the identification of numerous sources of yield loss that are attributable to false failures. These include test program timing issues, tester-tester variations, and load board decoupling/loading effects. By using Examiner to identify and resolve these issues, it is not uncommon for Wolfson to increase yields by 1-5% for a given device. By sharing standard Examiner reports with their subcons Wolfson is able to clearly document specific test issues and help the subcons improve their test process, to the benefit of both companies. Last but not least, Wolfson has seen a significant increase in their engineering productivity by using Examiner. Analysis that used to take days of number crunching with Excel can now be completed in minutes.

The Bottom Line

“We value the ease of use, speed and flexibility of Examiner. With the same tool we can look at 2 files interactively or set up scripts to analyze 10GB of data. Examiner paid for itself in the first 2-3 months just based on improved productivity alone.”

*M. Livingston, Product Test Engineer,
Wolfson Microelectronics*