



# Examinator Case Study: Microsoft Xbox

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## Xbox Challenges

In just a few short years Microsoft has become one of the top suppliers of game consoles in the world with its wildly popular Xbox series. But gaming is an intensely competitive marketplace, and Microsoft's Xbox development team is under constant pressure to improve performance and lower manufacturing cost with each new generation.



Reducing the parts count on the Xbox motherboard is one of the key ways that Microsoft can reduce its costs while improving reliability and performance. However, the Xbox is a complex multimedia system that contains microcontrollers, video logic, PLLs, voltage regulators, opamps, thermal sensors, etc. Combining these high-speed digital, mixed-signal and discrete functions all on the same IC has posed a number of design, test and manufacturing challenges. One of the big questions Microsoft engineers needed to answer was whether the discrete functions (e.g. PLLs, regulators, etc) included in the primary Xbox IC would perform adequately, given the variations of process, voltage and temperature. For this task, Microsoft chose Galaxy's Examinator software.

## How Microsoft Uses Examinator

Microsoft uses Examinator to characterize the ICs that will be used in the next generation Xbox console, to make sure that they will perform adequately. Since Microsoft ships millions of devices each year they must be 100% sure that their design and process are rock-solid. Hence, they perform an exhaustive set of tests on individual functions and combinations of functions, over several process, voltage and temperature corners. For example, on PLLs they measure frequency, jitter, duty cycle and short and long-term drift of these parameters. The net result is that their ATE system generates 10's of Megabytes of data for just a handful of sample parts.

## Results Before and After Examinator

Before selecting Examinator, Microsoft used a combination of Excel and manually generated scripts to perform this type of characterization. It typically took a day or two per test, and several weeks total to complete the characterization process. Now with Examinator the same process takes about 2 hours.

Using Examinator, Microsoft was able to spot a number of test programming issues and was able to determine that one of the on-chip PLLs could not reliably meet spec.

## The Bottom Line

***"Examinator gave us a 10x boost in engineering productivity and paid for itself the first time we used it. The tool is fast and easy to use- we just downloaded it and it worked!"***

*K.N. DFT Engineer, Microsoft*