



## CADENCE AND UPEK

UPEK helps customers reduce time to market by adopting Incisive Formal Verifier as part of an assertion-based verification environment

“By bringing Incisive Formal Verifier into the flow, we can now think about verification earlier in the design process—weeks earlier than before. That benefit alone gave us a huge boost in productivity. We also found the pre-defined formal analysis checks to be very useful. We were able to essentially start up the new environment and run checks right away.”

**Michele Borgatti**, IC Design Manager, UPEK, Inc.

### CORPORATE PROFILE

- UPEK creates biometric fingerprint security solutions for consumer and industrial markets

### DESIGN CHALLENGE

- Speed the design cycle
- Incorporate an assertion-based verification methodology (across formal analysis and simulation) into an existing design and verification flow

### CADENCE SOLUTION

- Address key verification issues up front in the design
- Add Incisive Formal Verifier (including Incisive Design Team Simulator) to UPEK’s existing flow

### CADENCE PRODUCTS AND SERVICES

- Incisive Formal Verifier
- Cadence Engineering Services

## PROTECTING YOUR DIGITAL WORLD

Mobile devices can access our most personal data with relative ease. Security used to be something we thought about only for government agencies or large businesses, but the digital revolution has brought the issue to our doorstep. That’s where California-based UPEK, Inc. comes in. A pioneer in biometric fingerprint technology since 1996, UPEK has made it their goal to make security simple, whether the solution is for a large federal agency or your personal computer.

The UPEK design team is structured in such a way that one group handles both the design and verification elements of the flow. “Our designs have to be flexible enough to plug into multiple interfaces in very different computing systems,” said Michele Borgatti, IC Design Manager at UPEK. “This translates into complex testbenches that activate different use cases and becomes significantly more time consuming. We needed to find a technique that would allow us to address

verification more effectively while also improving time to market for us and for our customers.”

## UPEK ADOPTS AN ASSERTION-BASED VERIFICATION METHODOLOGY

The UPEK team decided to incorporate an assertion-based verification methodology into their existing design and verification flow. “Some members of our team had used this methodology in the past and recommended that we adopt Cadence® Incisive® Formal Verifier,” continued Borgatti. “We were already using the Incisive Design Team Simulator in our flow. Our hope was that by adopting an assertion-based verification methodology across formal analysis and simulation, we would ease our learning curve and more readily be in a position to take advantage of integration benefits in the Incisive platform and the complementary nature of these technologies. That was indeed the case from the onset.”

"We were able to extend the debug capabilities that we had with simulation, and eliminated bugs in both modules earlier in the design flow with the addition of formal analysis. We were pleased to get such a positive result on our first design."

**Michele Borgatti**, *IC Design Manager, UPEK, Inc.*

"We were able to extend the debug capabilities that we had with simulation, and eliminated bugs in both modules earlier in the design flow with the addition of formal analysis," continued Borgatti. "We were pleased to get such positive results on our first design. The fact that we already knew the environment from our experience with Incisive Design Team Simulator all but eliminated our ramp-up time for getting into the Incisive Formal Verifier technology and debug."

## UPEK DESIGN TEAM SEES IMMEDIATE RESULTS USING INCISIVE FORMAL VERIFIER

One of UPEK's requirements was the ability to address verification issues up front in the design flow. "By bringing Incisive Formal Verifier into the process, we can now think about verification earlier in the design flow—weeks earlier than before," said Borgatti. "That benefit alone gave us a huge boost in productivity." The team was able to come up to speed very quickly using the new assertion-based verification methodology, largely due to automation features. "We found the pre-defined automatic formal analysis checks in Incisive Formal Verifier to be very useful," continued Borgatti. "We were able to essentially start up the new environment and run checks right away. The complementary nature of simulation coverage points also proved quite helpful."

## ASSERTION-BASED VERIFICATION METHODOLOGY BOOSTS CONFIDENCE AT THE SYSTEM LEVEL

The UPEK design team was able to quickly achieve their overall design quality goal using the new verification environment, which allowed them to work more confidently. "The first design we created using the new methodology had three modules with many interfaces, and we needed to be certain that we were verifying the interfaces correctly," said Borgatti. "We used Incisive Formal Verifier on two of the modules with a high degree of success."

The combination of Incisive Formal Verifier and Incisive Design Team Simulator provides a complementary set of technologies with strengths at different points of the design and verification flow—formal analysis being ideal early on and for complex control logic, and simulation being applied for chip-level, end-to-end validation. In addition, unified parsers, common language support, and an integrated debug environment ensure ease-of-use.

## UPEK PLANS FOR CONTINUED SUCCESS WITH NEW VERIFICATION METHODOLOGY

The UPEK design team experienced early success by adding formal verification to their design process, saving time and improving quality on the first design. "Based on how quickly we were able to see results using this assertion-based verification methodology across formal and simulation, we're looking forward to what we can achieve as we grow our expertise with the flow," summarized Borgatti.

**cadence™**

**Cadence Design Systems, Inc.**

Corporate Headquarters  
2655 Seely Avenue  
San Jose, CA 95134  
800.746.6223 / 408.943.1234  
[www.cadence.com](http://www.cadence.com)