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Final Report for
Design and Development
SAWAFE Peak Detector Chip

Prepared for:
Los Alamos National Laboratories
Subcontract 620210013-9Q

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I. Abstract

InnovASIC, Inc. was placed under contract by Los Alamos National Laboratories to specify, design, and have fabricated an Application Specific Integrated Circuit for the SAWAFE program. The design was completed, and an initial fabrication run was made. The ASIC vendor, under subcontract to InnovASIC, had an error in the initial build of the chip. An investigation of the problem is now under way. A second build is expected to be completed in June.

II. Objectives/Accomplishments

A. Specification Generation

InnovASIC was required to complete a specification for the Peak Detector ASIC. InnovASIC worked closely with LANL engineering to complete this task. The Specification was completed and delivered on October 22, 1993.

B. Vendor Selection & Support.

InnovASIC supported LANL in the Vendor Selection process. InnovASIC engineering had Vitesse and Triquint quote the job. Between InnovASIC and LANL, the decision was made to have Triquint perform the job. InnovASIC was to support Triquint during the fabrication and test of the Peak Detector. InnovASIC performed this task, and will continue during the second fabrication effort.

C. Design Capture

The objective of the Design capture phase was to get a gate-level model for the Peak Detector that could be verified against the requirements. This was performed in two phases. First, a VHDL model was written to get a functional understanding of the chip, and to generate test vectors for the final gate level model. Second, a gate level schematic was captured by InnovASIC at Triquint's facility in Beaverton, Oregon. It was this model that was used for Verification.

D. Verification

Verification is the task of ensuring the design meets the functional requirements. InnovASIC wrote test vectors for the VHDL model that were used to verify the gate design. A full timing simulation was performed to verify that the chip will work at the speed specified.

E. Vendor DRCs and ERCs

InnovASIC was to perform Design Rule Checks and Electrical Rule checks for the final design. This was performed using Triquint's design rule checking software at Triquint's facility.

F. Chip Fabrication

InnovASIC was to subcontract the fabrication of the Peak Detector to Triquint Semiconductor, and deliver the tested chip to LANL. At this writing, this task has not been completed.

A first pass at the chip was completed by Triquint Semiconductor. During Triquint's testing phase, a problem was found in the construction of the chip. A clock buffer input was found to not work at the proper voltage range. This is a fabrication error.

It is important to note that if the voltage supplied to the chip is modified, the chip will pass functional test. This means that the design works as specified.

At this writing, Triquint is performing a detailed investigation of the problem to find out what the exact error was. When that is complete, they will begin a second build. Many different explanations have been tried, but the exact cause of the error has not been found. It is InnovASIC's opinion that the cause was a very unusual fabrication process error that will not normally occur, and thus the second fabrication run should be successful.

III. Publications/Releases

No publications or releases of information have occurred during this contract. The only exception is the release of design information to InnovASIC's subcontractor, Triquint Semiconductor. Triquint obtained only the information needed to perform the tasks.

IV. Other Pertinent Information

The final product of the contract (the ASIC) has not been delivered. However, InnovASIC will continue to work with Triquint Semiconductor to facilitate the fabrication and delivery to LANL of the Peak Detector ASIC. InnovASIC will continue on this after the contract is closed. The chip will be delivered to LANL immediately after it is received by InnovASIC. InnovASIC will also keep LANL engineering informed as to the progress by Triquint.