

# Integrated Service Technology (iST)

## Changing the Existing Verification Model within the Semiconductor Industry

The semiconductor packaging industry today faces an ever-growing challenge of standard packaging is getting bottlenecked by limited production capacity. Further, due to an exponential growth in new materials and structures, advanced IC packaging requires much Design of Experiments (DOEs) in unknown fields. One of the most challenges in DOE lies in integrating different substances contained in chips by heterogeneous integration as complex stacking inevitably leads to many reliability problems, including CTE (coefficients of thermal

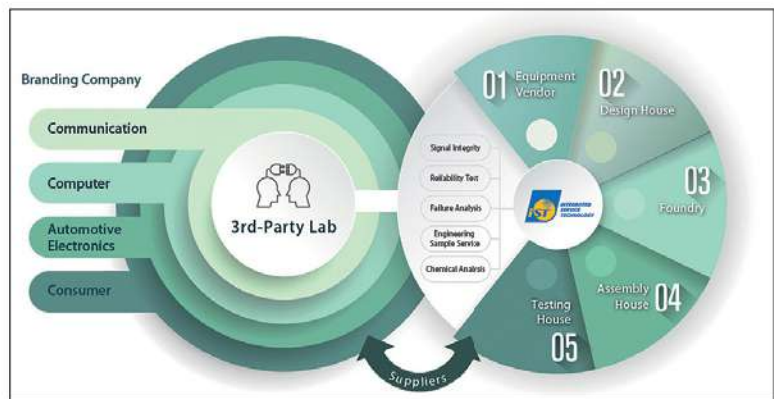
expansion) mismatch, chips warpage, and solder ball bonding issue. There is a causal relationship between these three problems, as the IC advanced packaging technology stacks materials of different CTE. Changes in temperature could result in varying expansion. This may lead to severe warpage and harder soldering to the PCB and affects the operation of the chip.

Enter Integrated Service Technology (iST). Established as a laboratory for verification and tests of the electronic industry, the company is changing the existing verification



model in the entire semiconductor industry. The “Focused Ion Beam (FIB) circuit edit” launched by iST is a service like surgery in an operating room to manually modify the desired product functionality in a micron or nanometer environment with state of art technology and advanced precision equipment. Cutting circuitry by this microsurgical approach can pinpoint errors of chips in the longitudinal direction and is more accurate and faster than etching technology commonly adopted by the industry at that time.

Instead of numerous tests to realize a design into mass production, the iST’s FIB circuit editing service enables you to minimize the trial-run time by editing chips in one shot. “It not only shortens the process time for approximately 3-6 weeks but also lower the costs (up to 10 million TWD) in extra mask making and IC production,” says Kim Hsu, Assistant Vice President at Failure Analysis and Material Analysis Engineering Division of iST. As today’s IC design houses continuously aiming for faster R&D speed, this innovative service model has been shortening the time span from concept design to mass production and market launch. iST had accomplished 176,832 cases and 369,130 chips for customers since its inception 27 years ago.



to death (RMA, Return Merchandise Authorization). Further, as the world’s top three IC assembly and testing houses (ASE, SPIL, and Amkor) are Taiwan entities, iST leverages this geographic advantage to hold local and immediate meetings with them at the early stage of experiments to tackle their problems on time and assist them in setting up the DOE process. “This not only enables iST to help customers to tailor-make test samples for quality and reliability verification but also to meet requirements of SMT of small-but-frequent batches,” states Allan Tseng, Vice President at Reliability Engineering Division of iST.

Amid the spreading of Covid-19 epidemic, the domestic electronics industry in Taiwan is actually booming, especially the foundry and packaging sectors. As a result, there are many opportunities in the traditional standard packaging, including BGA, QFP, and SOP, due to soaring demands in notebooks and desktop computers. With the largest capacity in package reliability verification in Asia, iST is ready to support these customer’s service needs. Further, there is an increase in advanced packaging demand as the standard one is getting harder to meet the demands imposed by the new generation of high-speed computing and data transmission. The iST’s verification service for advanced packaging targets on verifying the heterogeneous new designs. The company’s strategy provided is to integrate existing services of iST, including reliability verification and failure analysis to fit requirements of and deal with issues found in the form of joint diagnosis.

In addition, what differentiates iST from competitors is, its professional and exclusive talents, which is committed to assist customers in the semiconductor industry and dealing with material and failure analysis anywhere, anytime. Blessed by a rosy outlook of the semiconductor industry and huge verification demands driven by the clustering effect of semiconductor supply chain in Taiwan, iST has quadrupled its factory space from nearly ten to forty thousand square meters in 2017 to better serve incoming customer demands. 📍

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Based on continuous innovation and development in the past 27 years, iST is now providing services in four major categories: Failure Analysis, Reliability Testing, Materials Analysis, and Signal Integrity for more than ten thousand customers around the world. In terms of the 180,544 solutions offered by iST, it is virtually the medical center of the semiconductor industry aimed to help customers in accelerating R&D and controlling product quality. This is what the semiconductor industry needed from birth (R&D)