Meeting the needs of CPU/GPU functional test throughput.

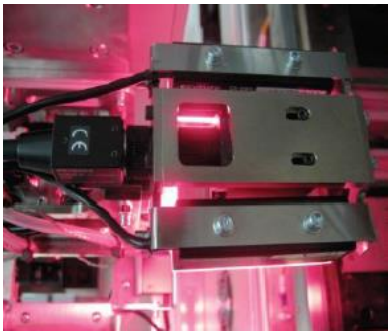
"Performance, Value, Integrity"

Getech Automation was established in 1992 to focus on developing and manufacturing machines and systems to meet key needs of the PCBA and Semi-conductor industries. Today Getech Automation is a world leader in PCB and Semiconductor back end Automation Systems.

Complexities at the silicon level continue to increase as the demand for functionality, power efficiency and speed drive development in processors. The process of assembling these complex and high value devices can be broken down in functional steps; and to maintain the production needs, modularized. So multiple machines of the same type can be setup in lines or cells to replicate a given process. Each process step has a specific cycle time that can be managed by the addition of more machine resources. By balancing the processes to each other an overall manufacturing cycle time for the finished component is managed. Once completed the devices have to be tested, and in some cases loaded with a specific software set to enable the devices design function. As parts have evolved the test times and the communication into and out of the device have increased in parallel to the degree that testing a part and loading its firmware may take as long as it does to make the actual device. This creates a bottle neck and a potential cost pinch point. The parts backlogged for test add to inventory costs and the demand for expensive factory floor space increases as test systems are accumulated in a drive to match test times to production times.

The complexity of the test systems mechanically must be able to match the demands of the devices under test. With hundreds of points of I/O and a need to connect every point under a fixed load of 30 Grams the total load needed within the test fixture can be high. As well larger I/O devices demand higher loads and controlling the compressive forces important if adequate contact is to be provided without creating damage. Maintaining the load for the period of the test is equally important so as not to lose contact midway through a cycle and forcing a restart. Another major issue with PGA and BGA devices is consistency of the I/O and actual presence of the ball or pin. A single pin or ball deformation could result in the parts failure should it find its way into a finished product. The end products where

these devices are deployed are high end consumer products and any failure in the field has implications to both the company warranty and brand exposure.



Lastly, the test sockets themselves are subject to repetitive mechanical compression and electrical activity, they are thus subject to wear and tear and if not monitored may contribute to a scenario of a false fail or worse, a false pass. To overcome these test related dilemmas and provide a production capable tool that both meets the demands of functional test but doubles as a final visual verification of the devices I/O, Getech Automation developed the VLST. In essence the VLST is a mini factory of test fixtures being served by a centralized robotics handler with on the fly vision system. The handler operates two pick and place mechanisms so it can simultaneously pick from a test socket and place the next part to the same socket. A vision check is conducted between the two PnP operations to verify the condition of the socket. This mechanism minimizes the transfer time of parts from their load trays – the test socket and the Pass/Fail outbound trays. The machine can handle up to 30 test stations. Once loaded to the test socket, the device is brought under a controlled mechanical load to ensure connectivity between the device I/O and the test socket points. When connectivity is established the test firmware is downloaded and the test can begin. If the final operating environment in which the part operates at elevated temperature, the system can be configured to elevate the local temperature in the test station to mimic the working environment.

In any machine system there is a need for maintenance and redundancy in the event of failure, the VLST is no exception. Sockets are worked hard in operation and on occasion will fail or need replacing. In such an event the test bay needing attention can be isolated from the rest of the system so while it is being worked on the remainder of the system is available to fulfil its task.

The demand for ever more complex CPUs and more powerful GPUs will continue to push the need for continued evolution of both the manufacturing processes and the test handling systems if they are to remain in balance and effect the shortest possible Total Time to Produce, the VLST has been developed with a modular approach so it can both be configured at the factory for a specific need or reconfigured in the customer plant as changes in the product change the test requirements.

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