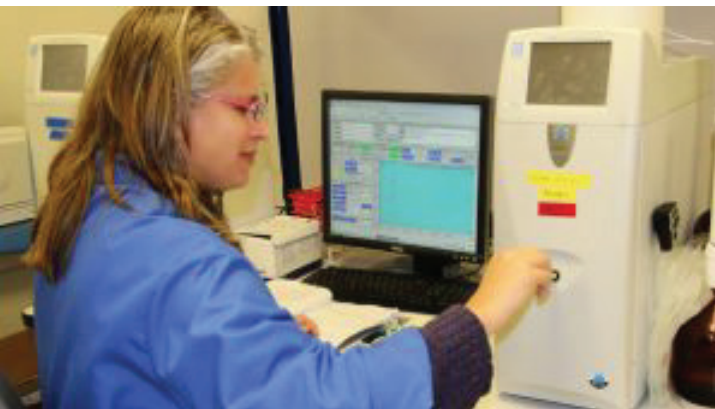


# The TRIAD Ensures Manufacturing Quality at STI

*By: Troy Moore, Systems Design Engineer*

STI is a multifaceted technical organization whose common goal is to provide support through products and services in the field of electronics manufacturing. We are equipped with a state of the art 26,000 sq. ft. contract manufacturing area that utilizes some of the most advanced equipment for small to high volume contract electronics manufacturing as well as development builds, R&D, prototyping and analysis. This environment enables engineers and analysts at STI to showcase our versatility while providing the highest quality services for a wide range of products and services in order to address the challenges and issues facing today's electronic manufacturers.



The primary objective is quality, and excellence in what we do brings about customer satisfaction. All STI processes are governed by a quality system certified to AS9100:2016 (which incorporates the ISO 9001:2015 standard), with manufacturing in accordance with J-STD-001 Space Addendum and inspection in accordance with IPC-A-610.

STI's reputation for a quality product is our main goal and marketing model. If we produce an outstanding product, existing customers will put the word out, attracting new customers. When a potential new customer first contacts us with a request for a quote, our sales and logistics team is there to assist with their project needs. The first step is to review the customer requirements and determine needs such as quantities required, whether the customer's project

will be turnkey (STI provides all manufacturing and supply chain services, including material acquisition, assembly, test, etc.) or Customer Furnished Materials (CFM), special tools or requirements needed for production, etc. Sales then submits the customer requirements/drawing package to Front End Engineering, Manufacturing Engineering, and Quality. Together these 3 groups are known as the Triad.

The Triad is a very unique team, not in title or individual group function, but in the unified purpose and involvement in every aspect of the production cycle. This is a rarity in the contract and manufacturing industries, especially in larger companies, where each group's primary focus is on the specific tasks, and the potential for a lack of interdepartmental communication and collaboration is higher. In manufacturing, and especially in the electronics manufacturing industry, excellent interdepartmental communication is essential in producing the best product possible.

Upon receiving the customer requirements/drawing package, the Triad then reviews the customer requirements/drawings and determines the requirements necessary to properly complete the project. There are certain factors that determine customer cost and lead times: required parts and their availability, component placement, temperature sensitive parts, required machinery, stencils, x-rays, SMT pallets, Automated Optical Inspections (AOI),



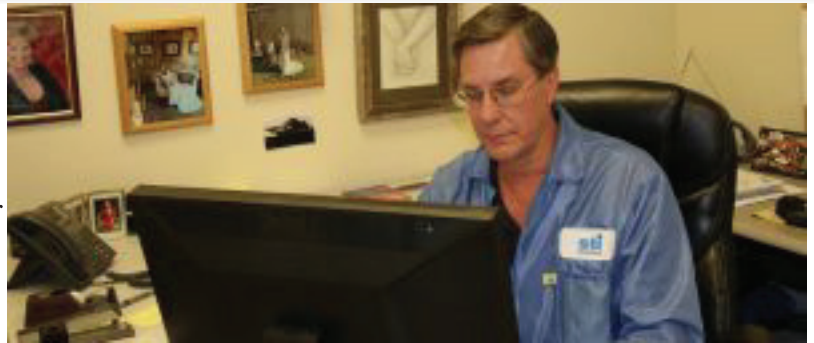
environmental testing (temperature, humidity, shock, vibration, etc.), flying probe tests, customer supplied test fixtures for functional testing, conformal coating, etc.

One of the steps in finalizing a quote for the customer is to establish the processing time. Once all of the time sensitive production requirements are clearly defined, the estimated processing time can be finalized. Following review of the customer drawings/requirements, the Triad consults with our purchasing department who provides updated information on the materials needed to start and complete the project. If the customer chooses turnkey production, purchasing contacts our authorized distributors to get pricing and availability on parts. If the required parts are not available or the lead times fall outside of the customer's required delivery window, purchasing consults with the Triad to explore alternate solutions and/or parts.

Once all of the alternative options and pricing are researched by purchasing and the Triad, these options are then presented to our sales and logistics team, who then relays this information to the customer. The customer then decides which option works best for them. Lastly, the plan is finalized and a formal quote is provided to the customer.

Upon receipt of the Purchase Order (PO) from the customer, our purchasing team starts the parts procurement process. In certain situations or times of the year, certain parts are readily available one minute and then long lead the next, resulting in having to repeat or revise the production schedule/options for the customer. Once that hurdle is ultimately overcome, our logistics team finalizes requirements for acquisition and production and presents them to the Triad.

Logistics first point of contact in the Triad is Front End engineering, whose first task in the production cycle is to develop a job package. The job package guides machine operators precisely through each step



(i.e., set up machinery and ensure all materials are readily available, send data to pick and place machine, inspection, packaging and machine operation duties, etc.) required to produce that particular package.

Manufacturing engineering also reviews the job package and ensures that all materials, processes and parameters are properly selected and implemented. Manufacturing also places a strong emphasis on defect prevention and non-value added process step elimination by analyzing the job package for common errors relating to the BOM selection, PCB design, and manufacturing materials/processes used to assemble the customer's product. Design for Manufacturing (DFM) and Design for Test (DFT) services offered by STI ensures quality of the final product and facilitates an efficient manufacturing cycle from fabrication, assembly, testing and ultimately through delivery. Ensuring that the customer's design aligns with the



latest and greatest existing manufacturing processes and materials will result in higher yields and fewer design iterations to generate a product that is easily and economically manufactured.

STI is also staffed with systems and design engineers. These engineers are available to generate special tooling and custom fixtures to ensure that the customer's final product meets form, fit, and function requirements. Our engineers are also available to troubleshoot at the system and component level of the customer's product during the manufacturing process.

Quality then reviews the job package for accuracy and conformance to the customer's requirements and their standards. Once the package has been approved by Quality, Logistics schedules the package for production.

When the package officially goes into production, the Triad begins the tracking and monitoring of the package production cycle to ensure that they meet both their quality requirements and the customer's product specifications. The Triad is critical in ensuring the following goals are accomplished prior to and during the production cycle:

1. The schedule is maintained and met.
2. The budget is met and if possible, improved upon.
3. DFM is pursued and accomplished. DFM is the general engineering practice of producing products in such a way that they are easy to manufacture. DFM allows potential problems to be fixed prior to the production phase, which is the least expensive place to address them.
4. If complex problems arise with a particular part, it is sent to our state of the art Analytical/Materials laboratory for material failure analysis.
5. All issues are discovered in a timely manner and relayed to the customer prior to final resolution.
6. If necessary, ensure rework & repair (BGA rework, PCB repair, CCA rework, Pad/Trace repair, etc.) is performed by our IPC certified technicians in a quick and efficient manner.
7. A Review of all production processes for accuracy.

8. Properly complete and finalize the job package.

When the production cycle is completed, Quality inspects the final product. Some of the methods and tools Quality utilizes for QA inspections are as follows:

Visual – The assembler is the first person to see the completed product, therefore simply viewing the product thoroughly with their own eyes is a critical component in a quality check.

Microscope – For less eye strain and to achieve enlarged views of the board's components, inspectors can use microscopes for detailed inspections.

X-Rays – X-rays offer a non-invasive way to visually inspect for proper PCB assembly

In Circuit Tests – In circuit tests such as fixtureless or flying-probe testing sends machine operated probes across the PCB to check test points at breakneck speeds.

AOI – High quality cameras and RGB LEDs reflect light and check for connection faults and solder quality.

Functional Testing – This is basically a full test run of the CCA once it has been manufactured, it consists of powering on the PCB and performing a series of self-tests.

For more information about  
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