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SMT Equipment Selection Process

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Agenda

- Scope
- Importance of selecting the right equipment
- Complexity Analysis
- Technology Assessment
- Quality Standards and Compliance
- Training and Support
- Market Feedback
- Negotiations

Purpose

“This guide is here to assist those seeking to purchase Surface Mount Technology (SMT) equipment. Our aim is to provide you with the insights and advice necessary to simplify the buying process.

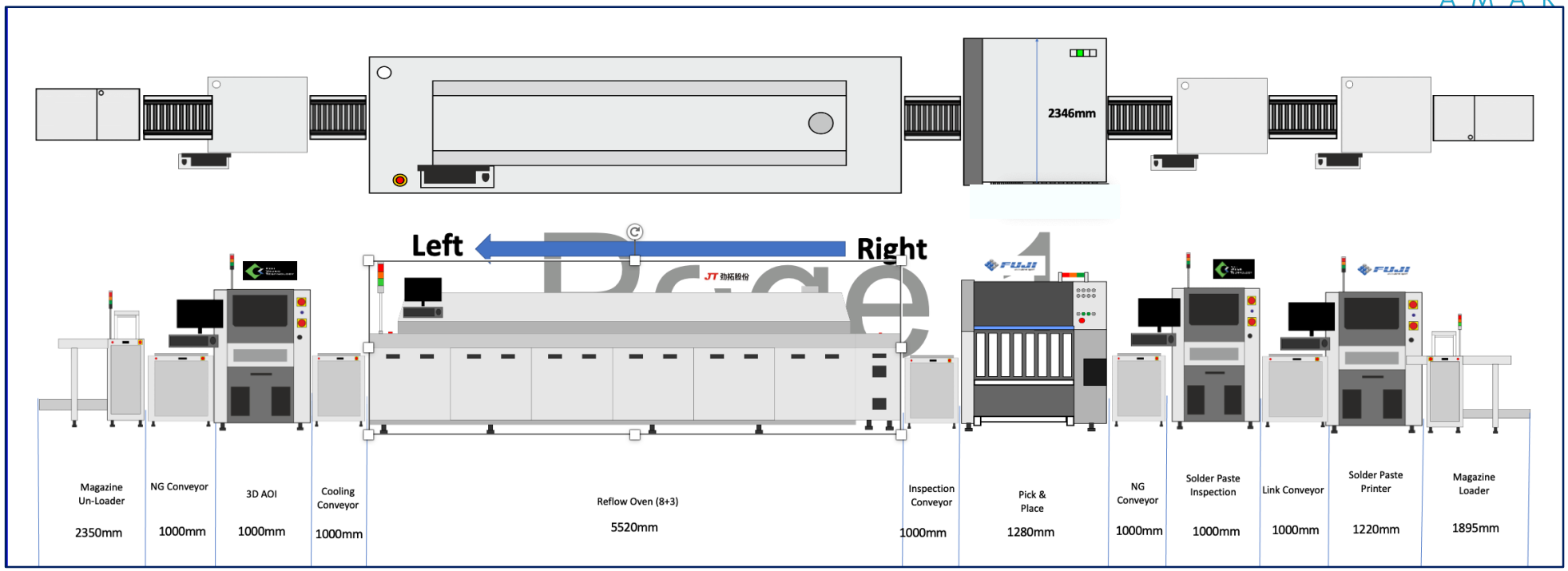
Whether it's understanding crucial factors to consider or comparing various sellers, our objective is to ensure you can make informed and wise decisions when acquiring your SMT equipment.”

Importance of Right Equipment's

Selecting equipment for PCB assembly in a manufacturing industry is a critical process that directly impacts the efficiency, quality, and overall success of the assembly line.

- **Efficiency and Productivity:** Optimize manufacturing processes, minimize downtime, and enhance throughput, resulting in faster production cycles and reduced lead times.
- **Quality Assurance:** Ensure precision and accuracy in critical processes, such as soldering and testing, to maintain consistently high-quality standards and reduce the risk of defects.
- **Competitive Edge and Adaptability:** Stay competitive by adopting up-to-date, adaptable machinery that allows for the incorporation of the latest technologies, addressing market demands, and facilitating quick responses to industry trends.

SMT Equipment Details

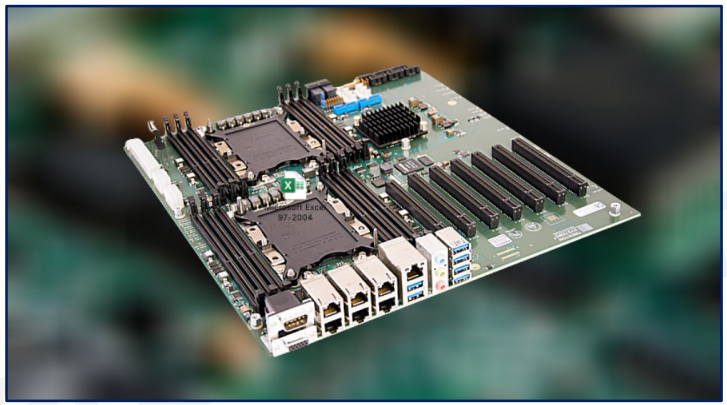


- Reference layout with one pick and place machine. Most of the SMT lines will have two pick and place machines, which is defined by the complexity of the boards to be produced on the line.
- Based on the space availability, the line can be configured from Right to left or left to right.

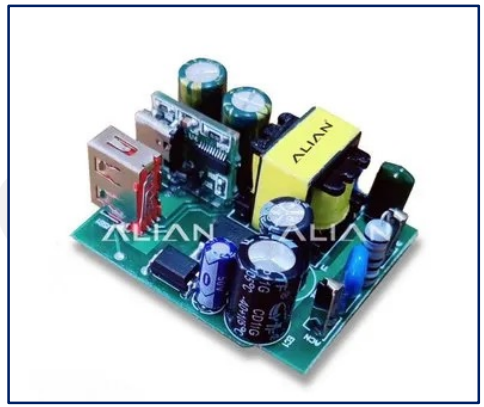
Product Complexity Analysis

The first step for designing an SMT line is to understand the product or family of products we need to manufacture on the line. The details can be -

- PCB Size
- Number of components
- Variety of components
- Largest component
- Smallest component
- Any special packages
- Single or double side SMT



Server Board



Mobile Charger

The line required for a server board's PCBA will significantly differ from that used in the production of PCBA for a mobile charger.

Format to capture the information in detail →

Microsoft Excel Worksheet

Technology Assessment

- *Capability Assessment* - Assess the latest technologies and capabilities available in the market. Stay updated on advancements in PCB assembly equipment to ensure your manufacturing process remains competitive and efficient.

- *Process Analysis* - Understand your PCB assembly process thoroughly. Identify key steps, including solder paste application, pick and place, soldering, inspection, and testing. This analysis will help you determine the types of equipment needed for each stage.

- *Compatibility* - Ensure that the selected equipment is compatible with each other and integrates seamlessly into your existing manufacturing setup. Compatibility is crucial for smooth operation and optimal efficiency.

Throughput Assessment

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- Determine the desired production throughput. Select equipment that can meet or exceed your production volume requirements. Factors such as cycle time, mounting speed, component distribution on the PCBA and Size of the PCBA defines the speed of the line.

- It is always recommended to plan an additional line, as soon as the current line start hitting 70%+ utilization for a high mix low volume line. The same number can be around 90% for a high-volume lines.

- SMT Line capacity needs to be planned for 3 shift operations for effectively getting the required return on investments. A certain time needs to be considered for changeovers if there is a plan to run high mix low volume business.

Quality Standards and Compliance:

Verify that the equipment meets industry quality standards and compliances. This is especially important for industries with strict regulations, such as automotive or aerospace. Few examples -

- It is almost a norm that no clean chemistry will be used for manufacturing aerospace products and all the boards need to be cleaned using chemicals in a cleaning machine. Organisations getting into aerospace products manufacturing, need to plan for cleaning machines.

- There is a standard requirement to have component traceability for all the components mounted on the PCBA. The equipment's needs to have the required hardware and software to support the traceability requirements. Traceability is a basic requirement for Automotive, Industrial, medical, defence and aerospace market segments.

Footprint and Space Availability

- *Optimizing Facility Space:* Evaluate the available space in your facility to ensure that the selected equipment aligns with the spatial constraints. Choosing equipment that optimizes the footprint contributes to an efficient layout, allowing for streamlined workflow and effective space utilization.

- *Facilitating Workflow Efficiency:* Select equipment that not only fits within the allocated space but also promotes an efficient workflow. A well-planned layout reduces the need for unnecessary movement of materials and personnel, enhancing overall productivity and minimizing potential bottlenecks.

- *Accessible Maintenance:* Consider ease of access for maintenance when choosing equipment. This accessibility contributes to minimizing downtime and ensuring the longevity and reliability of the manufacturing equipment.

Training and Support

- *Comprehensive Training Programs:* Assess the training programs offered by equipment manufacturers to ensure they are comprehensive and tailored to the specific needs of your operators. Adequate training enhances the proficiency of your workforce, enabling them to operate the equipment effectively and make the most of its features.

Equipment distributors these days have demo cum training centres. It is always recommended to visit these demo centres before making procurement decisions.

A well reputed brand of equipment usually have decent talent pool available in the market.

Training and Support

- *Ongoing Support Services:* Evaluate the reliability and responsiveness of the support services provided by equipment manufacturers. A robust support system ensures that, in the event of issues or challenges, your team can quickly access assistance.

Although SMT equipment's are very reliable and function without any issue most of the time. Still, a strong support structure from supplier is required in case of emergencies.

The equipment supplier support system must be approachable and available 24X7 as we cannot stop the lines under any circumstances.

Cost Analysis

- *Upfront Cost Assessment:* Conduct a thorough analysis of the upfront costs associated with the purchase of the equipment. This includes the initial investment required for acquisition, installation, and any additional components or accessories.

- *Ongoing Maintenance Expenses:* Factor in the anticipated ongoing maintenance expenses associated with the selected equipment. Consider costs related to routine maintenance, replacement parts, and any required software updates.

- *Return on Investment (ROI) Consideration:* Assess how the selected machinery contributes to increased efficiency, reduced production costs, and improved product quality over time. Prioritize long-term gains over short-term cost savings, ensuring that the chosen equipment aligns with the overall business strategy and goals.

This holistic perspective helps justify the initial investment by highlighting the positive impact on productivity and profitability.

User Feedback

- *User-Centric Insights:* Prioritize gathering user feedback and reviews to gain a comprehensive understanding of how the equipment functions in real-world manufacturing settings. Focus on insights related to user experiences, challenges encountered, and overall satisfaction levels.

- *Performance Evaluation:* Assess the equipment's performance by scrutinizing feedback from other manufacturing facilities that have implemented identical or similar solutions. Look for patterns and trends in the reviews to identify any recurring issues or strengths, enabling a more informed decision-making process.

- *Reliability Analysis:* Emphasize reviews that delve into the reliability of the equipment. Explore feedback regarding downtime, maintenance requirements, and any unexpected issues that may have arisen.

A thorough analysis of user experiences will contribute to a well-rounded evaluation of the equipment's dependability for seamless manufacturing operations.

Negotiations

- *Negotiations:* Engage in negotiations with equipment suppliers to ensure favourable terms, including warranty coverage and post-purchase support. A comprehensive warranty can provide peace of mind and protect your investment.

- *Hardware Keys:* A lot of equipment manufacturers provide USB dongles as hardware keys for the software. These keys sometime got lost during the life of the equipment and are very hard to procure and are very expensive. Always negotiates another set of hardware keys, to avoid machine down time and additional cost later.

- *Warranty:* Most of the equipment's comes with standard one year warranty. However, as a customer we should negotiate 1 + 2 years of warranty. As these are standard, high quality equipment's additional warranty comes at a very negligible cost.

Negotiations

- *Item wise Quote:* As part of negotiation process, we must have itemised quote for the equipment's with the options. As a customer, we need to pick and choose the options and select the right combination which is required for the business.

- *Spare part pricing:* List of critical spare parts to be finalised before finalising the equipment and prices for these spare parts to be finalised along with consumables required for the machine. Some of the reflow manufacturers provides lifetime warranty for heaters and blowers. That needs to be captured clearly at the time of order finalization.

- *Feeders Pricing:* It is always recommended to buy 30% feeders additional, compared to the feeders required for the current production volumes. The cost offered for these feeders is 3X if procured later. It is always recommended to negotiate and lock the prices of feeders before finalising the purchase order.

Negotiations

- *Delivery terms:* If you are starting a new business, it is important to consider DDU delivery terms if offered by suppliers. Matured businesses might consider ex-works payment terms and save money on the logistics compared to DDU.

- *Payment Terms:* All suppliers will ask for 10%-20% advance, which the customers needs to pay. The balance is usually before shipment of the equipment's from OEM's. We also advise customers to negotiates some portion (10% or more) of the payment after the delivery, installation and final buy off of the machines.

- *Annual Maintenance Contract:* It is advisable to negotiate AMC cost before placing the order with the supplier. It is better to negotiate the fixed AMC cost for next five years and the contract must include service level agreements.

Do you have more questions on topic ?

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Thank You