



STRATEGIC BRIEF

From Idea to Series Production

What Hardware Start-ups Should Consider When Moving into Series Production

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Introduction

The development of a hardware product does not end with a functioning prototype. When moving into series production, the requirements change fundamentally! A developed solution must become a product that is consistently manufacturable, with material supply, quality, cost structure and production capacity remaining manageable as volumes increase.

For hardware start-ups, this is precisely one of the most demanding phases. Development decisions have a direct impact on manufacturing costs, supply capability, certification, capital requirements and future scalability. What can still be solved pragmatically at the prototype stage can often only be corrected at considerable effort once series production is underway.

This Strategic Brief examines the key issues that need to be clarified before and during the transition to series production – from EMS partner selection and manufacturing and supply-chain considerations to planning the first production batches and subsequent ramp-up.

Typical Challenges for Hardware Start-ups

Small Production Volumes Meet Different EMS Structures

The EMS market ranges from specialized manufacturers serving prototypes and small production runs to providers focused on larger production volumes and international manufacturing structures. For a hardware start-up, the size of the EMS partner is therefore not the decisive factor. What matters is whether its technical capabilities, processes, production volumes, cost structure and capacity fit the specific project.

A particular challenge arises when moving from initial small production runs to increasing volumes. The partner must not only be able to reliably handle the current production volume, but also offer a realistic perspective for further ramp-up. EMS selection should therefore already take into account the planned development of the product and production volumes.

Manufacturing Know-how Is Often Missing During the Development Phase

Hardware start-ups naturally tend to focus on product development and technology. As a result, manufacturing issues are often not examined in detail until the prototype is already functioning.

By that point, however, fundamental decisions may already have been made – such as component selection, PCB design, assembly methods, test concepts or requirements for manufacturing documentation. If these aspects are only reviewed when moving into series production, this can result in additional iterations, modifications and delays.

Supply Chain Risks Without Sufficient Purchasing Power

For critical components, start-ups generally do not have the purchasing power of larger OEMs. At the same time, low annual volumes can limit access to preferred supply conditions, allocations or alternative sourcing channels.

Single-source situations that arise during development are particularly critical. A component may be readily available for the prototype and later become a supply risk as volumes increase. The availability of suitable alternatives should therefore be assessed before series production begins.

Capital Requirements and Investor Expectations

Moving into series production requires capital before corresponding revenues are generated. Tooling costs, minimum order quantities, material pre-financing, certification, test equipment and lead times need to be reflected in the financial planning.

For investors, it is not only important how far the technical development of the product has progressed. It is equally important whether the path from completed development through the first production batches to predictable delivery has been realistically planned.

What Matters When Moving into Series Production

Define Partner Criteria Before Selecting an EMS Provider

The selection should not primarily be based on the recognition or size of an EMS provider. What matters are the actual requirements of the project: initial production volume, product complexity, technology, quality requirements, expected volume development and the partner's willingness to support a start-up during its early phase.

The perspective beyond the initial production phase is equally important. A partner that is suitable for the first thousand units may not automatically be suitable for significantly higher volumes or changing requirements.

Assess Design for Manufacturing at an Early Stage

Design for Manufacturing should not be treated as a final review immediately before production begins. Component selection, PCB layout, assembly concept, testability and manufacturing documentation already influence during development how economically and reliably a product can later be manufactured.

The later fundamental manufacturing issues are identified, the greater the effort required for modifications tends to be. Early coordination between development and manufacturing reduces this risk and at the same time creates a better basis for subsequent series production.

Build the Supply Chain Deliberately

The supply chain for the series product should not simply be carried over from prototype sourcing. For critical components, availability, lead times, volume development, manufacturer dependencies and possible alternatives need to be assessed.

A dual-sourcing strategy can make sense for selected critical components. It should not, however, be treated as an end in itself. The key is to identify the actual supply risks and mitigate those where a failure could genuinely put series production at risk.

Align Capital Planning with Manufacturing Reality

Financial planning should reflect the actual requirements of the series ramp-up. This includes tooling costs, minimum order quantities, material pre-financing, certification, test setup and financing of the first production batches.

For young companies in particular, the difference between a technically completed product and a product that can actually be delivered in series can have a significant impact on capital requirements. This phase should therefore be planned not on the basis of generic assumptions, but on the basis of the specific manufacturing and sourcing situation.

Consider the Target Market from the Start

The manufacturing strategy should not be developed independently of the intended sales market. Certification, customs, logistics and market-access requirements can vary significantly depending on the target region.

Companies that consider Europe, North America or markets such as India or Brazil during development can align their manufacturing location, supply chain and partner selection accordingly. This reduces the need for later adjustments when the development project becomes an internationally marketed series product.

Assessment

For hardware start-ups, manufacturing often only becomes a central issue once technical development is already well advanced. By that point, however, key decisions have often already been made – regarding components, layout, manufacturing processes and suppliers.

EMS partner selection is therefore only one part of the task. What matters is early coordination between product development, manufacturing, supply chain and planned production volumes. The earlier these factors are brought together, the better later modifications, delays and additional costs can be avoided.

For investors, a robust manufacturing plan also provides a more realistic basis for assessing the path from the developed product to scalable series production.

Conclusion

The transition from prototype to series production is not a single manufacturing decision, but a process in which technical, operational and economic factors come together. The key decisions are often made well before the first series production order is placed.

For hardware start-ups, this means that manufacturing, supply chain, EMS partner, quality, certification and capital requirements should not be addressed one after another, but considered as interconnected elements of the series production concept.

About the Author

Dirk Kaussen is Founder and Managing Director of EMS Strategy Group. With around 40 years of experience in the electronics industry — including founding and managing his own electronics manufacturing company in Germany — he brings deep expertise in manufacturing processes, EMS partner selection, supply chain stability, relocation projects, and risk management. His approach combines practical solutions with a direct connection to industrial reality.

About the EMS Strategy Group

EMS Strategy Group supports industrial enterprises in the strategic and operational advancement of their electronics manufacturing. Our core expertise lies in the strategic relocation of manufacturing volumes, the selection of qualified EMS partners, the establishment of new production capacities, and the expansion of existing manufacturing structures.

Furthermore, we design resilient supply chain frameworks, conduct comprehensive risk assessments, and guide dual-sourcing strategies, with operational support through to a successful series production ramp-up.

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