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The Right-Sized Contract Electronics Manufacturer

Five Things to Look For in a Cradle-to-Grave Contract Electronics Manufacturing Partner

In Pursuit of the Right-Sized Partner

Small- to mid-size companies with electronics as part of their products tend to share this in common: electronics manufacturing is not a core business function. Contract manufacturers (CM), also known as electronics manufacturing service (EMS) providers, can provide them the expertise, buying power and infrastructure of an established manufacturer and its distributor networks.

But, the small- to mid-size company may feel vulnerable in the search for a CM willing to take on its low- to mid-volume business. It will have legitimate concerns such as:

- Will a CM bump me from the queue as soon if a high-volume customer walks in the door and throws its weight around?
- I'd like to build a relationship with a CM at prototype stage, but is a CM likely to be interested in just a few boards?
- What CM will have the time, patience or resources to devote to me in the early stages, to help ensure my product design is optimized for cost-effective manufacturing and quality?
- When the market picks up again, will I be "phased out" to make way for high-volume business?

In fact, such companies need not worry **whether** the right CM partner is out there, but rather **how to find it**. This paper defines the two general types of contract electronics manufacturing business models and details how one is ideal for the small- to mid-size company. It also outlines the five most important things a company with lower volume manufacturing needs should seek out in a long-term CM partner.

The Volume/Mix Model

Two general business models for contract electronics manufacturing exist, defined by the kind of product mix they support and expressed in terms of volume (number of pieces per batch manufactured) and "mix" (level of variety of product manufactured). These are:

- → High volume, low mix (HVLM)
- → Low volume, high mix (LVHM)

Metaphorically, the difference is similar to the difference between Yamaha Motorcycles and Orange County Choppers.

High volume, low mix: for mass production of a limited range of products.

Low volume, high mix: for a wide variety of products with fewer pieces per batch.

In 2002, Arrow Electronics, the world's largest electronic component distributor, defined HVLM "as a turnkey engagement with minimum annual production of at least 50,000 per stock keeping unit (SKU)" with a total engagement value of $20 million or higher.[1] HVLM manufacturers' profits depend on the ability to turn out tens of thousands of pieces with very little human involvement.

In contrast, LVHM contract manufacturers are structured to economically manufacture a variety of products in smaller batches (about 50-10,000 pieces). This kind of organization must be optimized to multi-task. It handles great product variety, frequent customer cycles, a high degree of customer interface and cross training

[1] Arrow Electronics Inc. 2001 Annual Report

among staff – all of which would disrupt the profitability of a HVLM manufacturer. By nature, the LVHM is a highly flexible organization and is ideally suited to serve small- to mid-size companies

Typically, a LVHM manufacturing facility is smaller than a HVLM setup. It may have a single line that supports high utilization. This is critical to the business model, as it matches the low-volume customer's need for economy: the customer does not pay for the overhead of a large, multi-line facility that does not always run at capacity. When choosing a LVHM manufacturing partner, the following five business elements should be examined.

1. Buying Power: Process Matters (not Size)

One of the greatest fears that a small or low-volume company has regarding its electronics manufacturing is that it will not be able to participate in economies of scale. Fortunately, the electronics supply chain is structured such that any CM, provided it is properly structured, can benefit. This is because the cost of parts is based on the "transaction costs" (cost to plan, order, receive and inventory a part) plus the volume (quantity) of **each** part purchased.

Look for power in processes:
- Automated forecasting capabilities
- Enterprise resource planning system (ERP)
- Competitive bidding process
- Participation in buying consortiums
- Offshore sourcing options
- Open-book costing

Contrary to popular misconception, cost-per-component does not decrease as a CM's aggregate spend increases. Thus, obtaining economies of scale requires good processes, not billions of dollars of purchasing power. The primary goal is to minimize the cost per transaction.

Look for a CM that has these necessary process elements in place:

- **Strong supplier relationships:** A CM's buying power can be enhanced through strong relationships with suppliers.
- **Competitive bidding process:** When performing due diligence to choose a CM, look into it's bidding process. Look for a yearly competitive bidding process (more frequently may indicate chaotic processes or weak supplier relationships) in which a variety of distributors are able to bid on the CM's total volume for the year. Also look for letters of intent (LOI) with the winning distributors, guaranteeing prices for the year.
- **Full utilization of sourcing infrastructure:** A CM with multiple products and a high-utilization manufacturing facility can fully utilize personnel and other sourcing resources in ways that a small company may not be capable of on its own.
- **Efficient enterprise resource planning (ERP) system:** A good ERP system provides tools to minimize the costs of tasks such as generating POs, receiving and holding inventory and more.
- **Access to a buying consortium:** For certain common parts, it may be possible to reduce costs through volume purchasing with a buying consortium. Participation in such a consortium is an indication that the CM runs a highly competitive bid process.
- **Offshore sourcing options:** In certain cases, outsourcing parts or labour to offshore locations may provide significant cost savings. Look for a CM that has offshore sourcing capabilities and find out what that CM's philosophy is regarding when and what to outsource. To ensure quality and delivery, the CM's processes should extend right to the source through a representative on the ground there.

2. Distributor Relationships

Much of the success of a CM's business is dependent on its distributors. These relationships determine pricing and how quickly parts can be available for an order. Once bidding is complete, the distributors that have won the business commit to prices and stock availability.

A CM with good processes in place and strong relationships with suppliers should have no qualms about providing open-book pricing. To establish the strength of a CM's relationships with its distributors, also look for:

- A competitive bidding process, as discussed above
- Bonding agreements, in which each supplier commits to hold a particular level of inventory in bond for the CM at all times and guarantees delivery within days, and letters of intent (LOI) in which each supplier commits to hold its prices for the year
- A process by which bond levels are regularly reviewed and adjusted as required
- An automated system through which all distributors have visibility into the CM's actual demand
- Contractual agreements that specify the penalties and processes in place to deal with distributors that fail to meet an inventory agreement

Strong distributor relationships ensure success:
- Open-book pricing
- Bonded inventory agreements (LOI)
- Checks and balances to hold distributors to their promises
- Transparency between the CM and its distributors

Beware of a CM that partakes in "renegade purchasing," the practice of asking distributors to bid again and again with each new order. While this approach seems highly competitive, in reality it suggests weak relationships. Renegade purchasing taxes the supplier relationship and may be an indication of poor processes. Ultimately, a CM's strong relationships with suppliers will benefit you, and a supplier that has fairly won the business for a year will (with appropriate checks and balances in place) be motivated to provide excellent service in order to maintain the relationship in future years.

3. Vested Interest in Keeping You Competitive

As previously mentioned, the LVHM manufacturing business model leaves room for frequent customer contact as required. Because of the diversity of customers it serves and products it manufactures, a low- to mid-volume CM has a vested interest in working closely with its customers for success.

As an indication of its interest in your company's well being, find out what programs or special offers the CM has designed to assist its clientele remain competitive – for example, programs designed to reduce your risk or prepare you for regulatory changes. Establish whether the CM is active in assisting its customers to stay abreast of industry trends, and ask for examples.

4. Flexibility Throughout the Business

Due to the nature of LVHM manufacturing, the CM should demonstrate flexibility throughout its business and processes. Flexibility is necessary to accommodate the multiple product types, customer types, timelines and manufacturing needs that a LVHM provider will deal with each month.

Look for these signs that the CM is flexible to meet your product's unique manufacturing requirements:

- Flexible service offerings (printed circuit assembly, test, box assembly, supply chain management, etc.)
- Strong LOI agreements with distributors that minimize inventory risk while making parts available in very short time
- Willingness to invest time in a new product or customer up front, even if volume manufacturing is months in the future
- Flexibility in the manufacturing line, including ability for concurrent setup and teardown and rapid change-over
- Ability to run multiple shifts and willingness to put in overtime to accommodate customer emergencies
- A mix of automated and manual processes suitable to handle a wide variety of products

- Able to work effectively with fully consigned materials and partially consigned materials, or able to source and supply all materials independently. The CM should aid in the transition from one such model to another.
- Ability to provide value-add services and advice, such as lead (Pb) free analysis and cost-reduction studies

In addition, while processes are critical to high quality manufacturing, the CM's processes must be flexible to accommodate a variety of customer and product types. Especially during early stages of product design, look for ways the CM helps its customers adjust to the rigors of electronics manufacturing, such as assisting in the development of appropriate documentation.

5. Cradle-to-Grave Solutions

It's possible that a low-volume product today may become the next Cisco router of tomorrow. For that reason, a CM that can offer cradle-to-grave services is important for a number of reasons. Find a CM that offers services for every phase of the product lifecycle, and one that can transition you to a high-volume manufacturer if that time comes.

For New Products

Providing high value new product introduction (NPI) services, such as design for manufacturing (DFM) and test design, will help a new product achieve success. Look for a CM with NPI services to ensure your product can be economically manufactured, assembled and tested at high quality. Only "manufacturable" products can ever hope to achieve increased production volumes.

For Mainstream Products

As new products reach mainstream production, the greatest concern is efficient, consistent and high quality manufacturing, assembly, test and delivery. While your initial concern may be a CM's NPI services, ensure that the CM has everything in place to support your product through to maturity. This includes rigorous quality process, supply chain management, test, warranty and support services.

For Mature Products

A LVHM manufacturer's flexibility can support transition processes. This is valuable for mature products, which a company may want to transition to a CM to make way for new products. Look for a CM that is willing to transition existing inventories, making the journey from partial to full turnkey manufacturing services a smooth one.

Transition to High Volume

Certain products – such as telecommunications or consumer electronics products – are meant to be high-volume and are not likely to be taken on by a LVHM contract manufacturer. But in other cases, the fit will be right for many years until volumes reach a point where a HVLM manufacturer will be necessary to manufacture the product. Look for a CM with strategic relationships that will help make the future transition to high-volume production a smooth one.

The Right Fit

Smaller companies or those with low-volume products that include electronics may be concerned that they cannot be top priority for a contract electronics manufacturer, or may not be able to participate in the industry's economies of sale. But in fact, the opposite is true if you know how to look for and evaluate CMs. AS LVHM manufacturer has both the business model and the interest to serve the small- to mid-size company with lower volume production needs. This paper has outlined how the LVHM business model is designed to work for smaller companies, and what such a company should look for when performing due diligence to choose a CM partner.