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PCBs with High-Speed Constraints

PRINTED ELECTRONICS: ON A ROLL

But Will the Technology be a Game-Changer, or a Sideshow?

Nitrogen in Soldering

Determining Impedance Control

Ensuring Component Integrity

Building a Vertical Model

Switching from a single offering to end-to-end involves breaking down certain internal barriers.

EVERYONE KNOWS IT'S an outsourced world. So how to compete? How about integrating vertically?

Good reasons abound, but first and foremost, integrating is a response to existing customers' needs. The vertically integrated supplier transcends the mundane to become a key factor in its customers' success. Generally, too, it appeals to a broader base of prospective customers, allows outsourcing trends to be fully exploited, creates revenue and margin opportunities, and changes the scope of competition.

Formed in November 2002, upon its divestiture from IBM's Microelectronics Division, Endicott Interconnect offers end-to-end electronics packaging and production, from semiconductor package design and fabrication, to laminate development, bare board fabrication, component assembly, test, and box-build. It takes a lot of space and a lot of manpower to do all this well (in our case, 1.4 million sq. ft. and more than 1,600 employees), and we've enjoyed a good run after a challenging start as a brand new company.

Now our model evolves. Through the IBM years, we were a manufacturer of components and an integrator of systems in the form of capital equipment. Newly formed EI focused strictly on manufacturing components. Today, we manufacture components while simultaneously growing a systems integration business in which we move backward toward the bare die and forward toward direct fulfillment.

Along the way, we've learned that the more you offer, the more credentials are necessary. (In our case, the list includes AS9100, NADCAP, ISO 13485, ITAR, among others.) We recognized the need to spend money on people, equipment, facilities, and capabilities (capital spending hovers around 8% of annual revenue, and our R&D budget ranges from 2.5 – 4.5%). We learned to build incrementally on existing talents. And we aggressively sought ways to do more for every customer.

To extend our reach first meant recognizing the limitations of our structure. Silo organizations were built around business units (component substrates, printed circuits, printed circuit assemblies), with conflicting objectives among units. When it came to competing for resources, a certain selfishness prevailed.

To tackle the problem, we unified the business units under a single management team and hired staff with skill sets the organization lacked. This also meant shedding workers who would not, or could not, support the changes that had to be made.

Concurrently, we remodeled existing space to establish premier manufacturing facilities. We allocated capital to increase capacity and improve capabilities, specifically focusing on capabilities that would enhance the vertical integration strategy. For instance, we acquired eV Products (now eV Microelectronics). The CZT crystal technology we gained with the acquisition is used in sensing applications in medical and homeland security applications – two market segments that are integral to our strategy. We added staff with program management skills. And we sought synergies with public and private sector organizations to leverage resources, exemplified by the Center for Advanced Microelectronics Manufacturing on our campus.

'Brainpower as a differentiator.' Besides bringing in talent to plug identified gaps, we also redoubled our efforts to use existing in-house expertise. We had an R&D group with over 800 career patents. We began to focus its efforts on customer problems – whether materials, processes, or systems. Sometimes we ended up developing new processes and materials where commercially available ones were inadequate. In short, we profited by putting our technical experts face-to-face with our customers. Where some companies tout their pricing or global reach, we used brainpower as a differentiator.

Meanwhile, we set about penetrating the customer on every level. Within our sales and marketing organization, we built skill sets compatible with selling broader capability. The vertically integrated company sells more than a single widget or service, so it must look deeper and wider at what the customer is doing and what they need. Ask: What more can I do for you? How can I show you? Then blow your own horn, often and loudly (this column is one example).

It takes bench strength to win big end-to-end programs. We hired electrical designers and software engineers, added system architecture expertise, applied our expertise in hardware design (substrates, power, cooling), and figured out how to cost and price all these new things. Through it all, we learned to collaborate both more often and to a greater degree with customers and other organizations.

Moving from a single product or service to a vertically integrated model requires constant focus on how to make your company more attractive to existing and prospective customers. At the same time, however, it means keeping an eye on the ground to avoid pitfalls that come with doing multiple new things simultaneously. Make use of the underutilized talents of your staff, and plan on hiring and firing, too. The transition requires collaborations, partnerships, and, yes, spending, but the payoffs can be huge. CA

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