

# IUU Make or Buy How to Decide?

This manufacturer's conversion from vertical integration has left performance indicators looking up.

Ed Westhaver

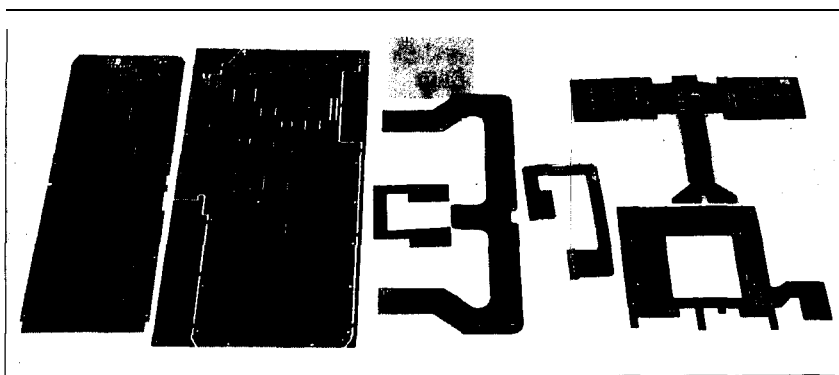
**F**or U.S. manufacturing to survive and prosper in the 1990s and beyond, we must change the paradigms of the past. One such paradigm, vertical integration, increases overhead costs and consumes space and resources.

For years it was believed that the ability to internally manufacture and control the supply of raw material was critical to success. Traditional analysis led us to believe this was the most profitable approach. In some cases, cost was the driving force behind the decision to pursue vertical integration. Further fueled by a distrust of vendors, it became widespread.

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## Vertical Integration: The True Costs

During the 1960s and 1970s there may have been some validity to these ideas. But most material suppliers have evolved during the electronics manufacturing industry's journey toward world-class standards. We must now focus on discovering the true cost of maintaining a vertically integrated operation. Standard costing techniques must be examined and an in-depth analy-



*Foxboro now outsources these MLBs and Kapton flex tapes, previously manufactured in house.*

sis performed. In a 1990 conversion program, we found that the real costs of a vertically integrated operation far exceeded those indicated by traditional accounting standards, or a make vs. buy analysis.

One sector of electronics manufacturing that's still widely vertically integrated is PCB production. This integration has been driven by concerns for quality, delivery, integrity and, most significantly, cost. Many PCB suppliers are well on the way to world-class status, producing high-quality product and eager to develop partnerships with electronics manufacturers. But how can they determine the internal costs?

The material costs should be relatively easy to pinpoint. These include the purchase orders placed to support PCB manufacturing. The inventory carrying cost should also be considered. Depreciation costs should be obtainable from most accounting records. But while these costs can be significant, the most important factor is overhead, or support costs.

All or most of these costs are typically included in the company or divisional total overhead and assessed to an individual operating segment based on use of space or a similar formula. This method not only underestimates fabrication costs; it

gent EPA limitations are requiring more sophisticated and expensive treatment equipment. Municipal charges assessed to industry are escalating rapidly. The process effluent flow can usually be metered easily, but the cost of effluent treatment chemicals and manpower must also be determined.

A study of the conversion program described in this article revealed some surprising statistics. At a 375,000-sq.-ft. manufacturing operation, of which only 37,000 sq. ft. were used for PCB fabrication, the PWB operation comprised the following costs:

- electricity—35%
- water--80%
- heat—50%
- effluent treatment—90%.

These costs don't include less tangible factors, such as the ongoing investment required to maintain process technologies or corporate support from legal and environmental services organizations. But the results do allow for accurate analysis of the costs involved in maintaining an in-house fabrication process vs. those entailed in migrating to a supplier base.

The program involved a base of 690 part numbers (95 high-tech boards, 540 low-tech boards, and 55 flex tapes) and a volume of about 5,000 sq. ft./week. In the study, traditional standard costing showed that in-house manufacturing costs were about the same as or slightly less than vendor-supplied services. The analysis revealed that, even considering the anticipated costs for prototypes, engineering change orders, and staffing the purchasing support team that was put in place, there would be a potential annual savings of over \$2 million.

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## Outsourcing: A Package Deal

When evaluating and negotiating with potential suppliers, it's critical to enter the process using a partnership approach. Suppliers must

be evaluated on the basis of traditional measures of quality, delivery, and cost. However, the mutual commitment of both parties is equally important.

Here are some guidelines for benchmarking a supplier's potential:

- financial strength
- management's commitment to excellence
- design/technological capabilities
- quality capabilities (including SPC )
- cost competitiveness
- service/flexibility
- manufacturing skills
- cycle time
- partnership extension to sub-suppliers
- level of employee participation.

Once the decisions are made, conversion must progress immediately and every detail must be monitored rigorously. In the case detailed in this study, a commodity team was put in place to support both the business and technical aspects of the conversion. Because the effort required to tool up the supplier can be substantial, a practical strategy is needed to ensure a smooth transfer. The most logical approach is to convert as soon as possible to an outside just-in-time delivery source for high-volume products while conducting some large last-time build runs of low-volume products. This will ensure rapid realization of targeted savings while limiting inventory and allowing tooling activity to be distributed over a reasonable time frame.

During negotiations with potential suppliers, the focus must be a package deal. The historical tendency for suppliers to quote high on low-volume product is unacceptable. The customer is looking to develop a partnership arrangement, directing all its demand to one supplier. The supplier, in turn, must realize that there will always be some low-volume products that will not yield the same profit as high-volume runs.

While the quantity of part numbers will have an impact, all high-volume products should be converted within three months. The balance, which comprise lower-volume products included in the last-time build, may be scheduled such that the first outsourced receipts occur over the following several quarters.

Two other issues affect this divestiture activity: the impact on the work force and the liquidation of PCB fabrication equipment.

Communicating the details of the conversion program to the work force can be the most difficult part of the outsourcing program, but honesty is still the best policy. Once the decision is made and the new supplier selected, the entire work force must be informed of what's happening and why, and of the timetable slated to complete the outsourcing. If possible, these displaced employees can be moved to other areas.

While potential suppliers are being evaluated, alternatives for equipment liquidation should be pursued. Consignment, an auction, or purchase by an existing manufacturer are among the options. The most expeditious approach is usually an auction. While there are many ways to implement an auction contract, one that provides a guaranteed minimum with mutual participation beyond that level typically yields the highest return for both parties.

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## A Progress Report

The conversion detailed in this study was completed for all products in less than six months, with no disruption to the assembly area. A 200-person internal PCB fabrication operation has been reduced to a staff of four employees. In addition to enhanced delivery performance and quality, financial results have exceeded expectations, with savings to date topping \$3.5 million.