



Overview

Company Profile:

Masimo Corporation develops, licenses and markets advanced medical signal processing technologies and products for noninvasive monitoring of patient vital signs, including innovative motion and low perfusion-tolerant pulse oximetry.

Industry:

Medical instrumentation

Business Drivers:

- Minimize costs while ensuring adequate flow of subassemblies
- Shorten time to market for new products
- Mitigate risk of supply chain interruption

Jabil Services:

- Subassembly production and testing
- Rapid prototyping
- Design-for-manufacturability and design-for-testability evaluation

Results:

- 98% incoming acceptance rate for subassemblies
- Almost complete elimination of field failures
- 30% reduction in time to market for new products
- 30% reduction in average subassembly build time
- Two-fold increase in fulfillment of year-end orders for two years in a row

Executive Summary

Phenomenal demand for its core market of pulse oximeters drove Masimo Corporation to look for a top-tier electronic manufacturing services (EMS) vendor that could keep pace with the company's rapid growth. The clear winner of the evaluation was Jabil, based on a number of factors including flexibility, high quality, broad range of capabilities and financial stability. Masimo is extremely satisfied with Jabil, having achieved a significant reduction in field failures and a 30 percent reduction in time to market for new products.

Masimo Reduces Time to Market, Handles Skyrocketing Growth with Jabil Assembly and Prototyping Services

Improving Neonatal Patient Care

Neonatal intensive care units (NICUs) depend on high technology equipment to care for newborn babies who are born seriously underweight or with other life-threatening conditions. Clamped to one tiny foot, each baby wears a small adhesive sensor connected to an electronic monitoring device called a pulse oximeter. The pulse oximeter provides a numeric display of the oxygen level in the bloodstream, which NICU physicians rely on to control the flow of oxygen to the newborn. Oxygen flow rate must be precisely managed: Too little and the child can suffer brain damage or die, while too much can cause eye damage or even blindness due to retinopathy of prematurity (ROP). A great deal is riding on the accuracy and reliability of pulse oximeters.

Masimo Corporation, a medical instrumentation company with headquarters in Irvine, California, designs and manufactures some of the best pulse oximeters in the world, as well as other noninvasive monitoring devices. Masimo's unique technology provides extremely reliable readings of oxygen saturation levels, even in difficult circumstances such as when the patient moves frequently or has poor peripheral perfusion (blood flow). That technological edge has created enormous demand for Masimo products, fueling the company's extraordinary growth over the last decade.



Making sure that Masimo has sufficient manufacturing capacity is the day-to-day concern of Gary Waite, Masimo's vice president of manufacturing. "We have seen significant growth each year, so we are continually expanding our production capabilities," explains Waite. "And with our R&D group developing new products at a rapid rate, we put three or four new types of subassemblies into production every quarter." Masimo has always used an electronic manufacturing services (EMS) vendor to manufacture its electronic subassemblies, which are then sold to OEM customers, or integrated into finished goods at Masimo's Irvine plant.



The rugged design and portability of the Masimo Radical Pulse Oximeter provides continuous and reliable arterial oxygen saturation monitoring in all hospital settings, from ER and ICU to clinic and general floor, as well as for transport and home use.

"Jabil has given us a high level of quality and the ability to respond to rapid growth. I firmly believe that, in Jabil, we have a partner who can take us years into the future."

—Gary Waite, Vice President of
Manufacturing, Masimo Corporation

Need for Production Capacity Drives Search

About four years ago, Waite began to suspect that his current EMS vendor wouldn't be able to keep up with Masimo's meteoric growth. With so much on the line, he initiated a search for a new vendor, identifying eight potential candidates. Waite's team developed a detailed set of evaluation criteria to use in rating the EMS vendors. With patient care at stake, it's not surprising that the top criterion was quality. Other important factors were cost, the ability to deliver, financial stability and breadth of capabilities.

When Waite reviewed the results, he got a surprise, albeit a pleasant one. Out of the eight, Jabil (at the time Varian Electronics Manufacturing, later acquired by Jabil) came out number one in every important category. Despite Jabil's superior rating, Masimo was reluctant to rely on a single vendor, fearing supply chain interruptions due to a natural disaster or vendor financial problems. Going into the selection process, the company's plan had been to divide the business between the two top-rated vendors.

However, a closer look at Jabil's financial situation and disaster recovery plan changed Waite's mind. "Jabil's financials are far superior to its competitors'," says Waite. "And its disaster recovery plan features both 100 percent data duplication at a disaster recovery site and full redundancy of manufacturing capability." All of Jabil's plants are linked to the same material requirements planning (MRP) and quality assurance (QA) systems, have the same relationships with distributors and suppliers, and use the same production equipment and test platforms. Says Kathy Spain, Masimo's director of materials, "To move a job to another plant, Jabil just throws the switch. It's completely seamless to the customer." Masimo concluded that it would actually be adding risk, not mitigating it, by splitting the work between two vendors, and therefore awarded the entire account to Jabil.



The technical innovations embodied in Masimo's sensors (Masimo LNOP® sensor shown above) and pulse oximetry systems are covered by more than 170 patents.

“One of the best things about Jabil is that they are so flexible. When we change a forecast or pull in a delivery date, they are extremely responsive.”

—Kathy Spain, Director of Materials,
Masimo Corporation

Getting There First With the Most

Masimo first saw the benefits of the Jabil relationship on the product development side, where the overriding emphasis is time to market. How important is time to market for Masimo? “It’s everything,” Waite asserts. “Once a new design receives FDA 510K clearance, we have to move fast to capitalize on our R&D investment by getting product to customers in quantity.” Jabil’s approach to prototyping shortens Masimo’s time to market, according to Waite: “Jabil has superior quick-turn prototype capabilities, so we can work out problems quickly. And they build prototypes on the same equipment that they use for production, so when the prototypes work, we know the production units will work too.” Since Masimo moved its subassembly manufacturing to Jabil, it has seen a 30 percent decrease in time to market.

As part of its prototyping service, Jabil evaluates Masimo’s designs for manufacturability and testability, providing feedback during the development process when changes are easier and less costly to implement than in production. Jabil also scrubs the prototype bills of materials to identify long-lead components so that Masimo’s design engineers can qualify alternate parts and thus shorten build cycles. These services have contributed to Masimo’s relatively short average prototype build cycle of one to two weeks, an important factor in responding to fast-growing markets.

Keeping the Production Line Moving

On the production side, Masimo has been pleased with its ability to access relevant data from Jabil. For example, Jabil provides each customer with an online portal. “Our planners can go to the Jabil customer portal and check order status or get shipping information whenever they need it, around the clock,” Spain says. “We only call our Jabil contacts to handle exceptions and problems, not for routine status information. It saves us a lot of time.”

An important aspect of supporting Masimo’s production requirements is adapting to changes in the forecast. Spain is more than satisfied with Jabil’s response to changes: “One of the best things about Jabil is that they are so flexible. When we change a forecast or pull in a delivery date, they are extremely responsive.” Waite concurs, recalling an incident in late December 2003 when Masimo received several large, unexpected orders, literally doubling the quantities it had forecast to Jabil: “We were under pressure from customers, who wanted to capitalize on the additional sales. I called my contact at Jabil, and said, ‘I need your help.’ Within minutes, Jabil people were calling us, verifying order quantities and coordinating deliveries. They delivered 100% of our requirements, even working during their scheduled Christmas shutdown!”

And it didn’t stop there. The following year, Jabil recommended doubling Masimo’s December forecast, offering to keep the additional units until January if they weren’t needed. Just as in the previous year, Masimo received a late surge of orders, but this time Jabil already had additional subassemblies built and ready to ship. “We wound up taking everything they had built and more,” remembers Spain. “It really impressed us that Jabil was willing to carry the inventory an extra month or two just to make sure that we were covered. They don’t just respond, they anticipate.”

Cost Savings Feed Bottom Line

In Masimo's highly competitive market segment, keeping a tight reign on cost of goods sold (COGS) is a requirement for profitability. For that reason, Masimo encouraged Jabil to look for ways to save costs. "Time and time again, they came to us with ideas that drove down our COGS," remembers Waite. "Jabil considers cost saving to be a normal part of their service."

Quality Is Masimo's Dominant Concern

Fast deliveries and cost savings are of little value unless the product works reliably. Waite is enthusiastic about Jabil's quality: "With our previous vendor, we occasionally had problems. In fact, acceptance rates for incoming subassemblies dipped as low as 60 percent. Jabil? They're currently running at 98 percent, almost unheard of in this business." That high level of subassembly quality has translated into a significant reduction in field failures since Masimo switched to Jabil. "Our field failure rates were small to begin with, now they are miniscule," Waite says. "They have to be, there's so little margin for error in our business."

How does Jabil achieve such a high level of quality? "Training," explains Waite. "They have great facilities and excellent professional trainers who are knowledgeable in areas such as IPC standards and workmanship and electrostatic discharge (ESD) controls. Jabil's training is so good that we eliminated our internal training group and bring their people here once a year to run our IPC training."

Jabil also shines in the area of documentation, which Masimo needs to show compliance with regulations as well as ISO certification. "Jabil's documentation system is first rate," says Spain. "They can prove that every ECO [engineering change order] is implemented, every board revision is up to the latest specs, every component supply chain documented."

Jabil's People Make the Difference

Ultimately, the success or failure of any business relationship comes down to people. "Jabil's greatest strength is their people," says Waite. "When I visited their facility, I could tell that Jabil's people all know each other and work together well. Their turnover is extremely low. That's important to us because it directly affects not only Jabil's ability to meet deadlines but also the quality of the delivered product."

Looking into the future, Waite sees an important role for Jabil: "Jabil has given us a high level of quality and the ability to respond to rapid growth. I firmly believe that, in Jabil, we have a partner who can take us years into the future."

For more information about Masimo, please visit www.masimo.com

For more information, please contact your Jabil Circuit representative or visit us at www.jabil.com.

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