

# Flextronics Streamlines Manufacturing Processes and Communicates Globally Using Microsoft Visio Diagrams

## Microsoft Visio Case Study

September 2002

*Optimal operational efficiency—the primary goal of any electronics manufacturing service (EMS) contractor—is also top priority at Flextronics, a leader in EMS with short production cycles that are the envy of the industry. On behalf of Microsoft® Corporation, META Group Consulting recently conducted interviews at Flextronics to determine how Microsoft Visio® met the contractor's manufacturing design and communication needs. The interviewees reported a 125% average increase in effectiveness and a 109% average increase in efficiency as a result of using Microsoft Visio diagrams to analyze process flows, design production lines, layout shop floor plans, model equipment databases, and communicate with employees and clients who speak different languages on teams spanning four continents. With increases like these, it's clear that Microsoft Visio meets Flextronics' diagramming needs by streamlining its manufacturing process, which in the end equates to short time-to-market cycles for Flextronics clients and a competitive advantage over other EMS contractors for Flextronics.*

### **Flextronics needs a diagramming tool that teams can use to visualize and optimize the manufacturing process**

With more than 70,000 employees worldwide, and design, engineering, manufacturing, and logistics operations in 28 countries, Flextronics—an established leader in contract electronics manufacturing services—is one of the largest, most extensively computerized and automated manufacturing companies in the world. Flextronics focuses on providing operational services to technology companies that don't have their own hardware or electronics manufacturing plants. To ensure shorter design and production cycles, and fewer production and manufacturing problems, Flextronics forms design and production partnerships with its clients for the products it manufactures. So instead of building costly plants, technology companies turn to Flextronics to manufacture their products for them, as Microsoft Corporation does for Xbox, Ericsson does for cellular phones, Cisco does for routers, and Hewlett-Packard does for printers.

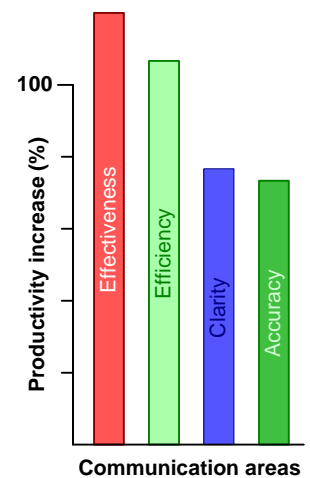
META Group Consulting recently conducted interviews with ten Microsoft Visio users at Flextronics, ninety percent of whom were technical professionals, to determine what they needed in a diagramming tool, how Microsoft Visio fulfilled their needs, how they used Microsoft Visio in their manufacturing process, and how they communicated with Microsoft Visio diagrams worldwide. Everyone from the Senior Director of Worldwide Development/Infrastructure to the Manufacturing Enterprise System (MES) Lead Engineer reported the need for a diagramming tool that would not only optimize their manufacturing process by allowing them to visualize production lines, control points, equipment, shop floors, and databases, but would also enable them to quickly communicate design changes and manage information among people in teams and departments spanning four continents and speaking a multitude of languages.



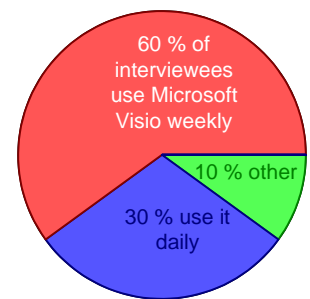
### Interview findings

The following information applies to those interviewed at Flextronics.

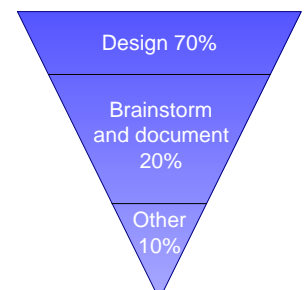
#### Productivity increases due to enhanced communication



#### Frequency of Microsoft Visio usage



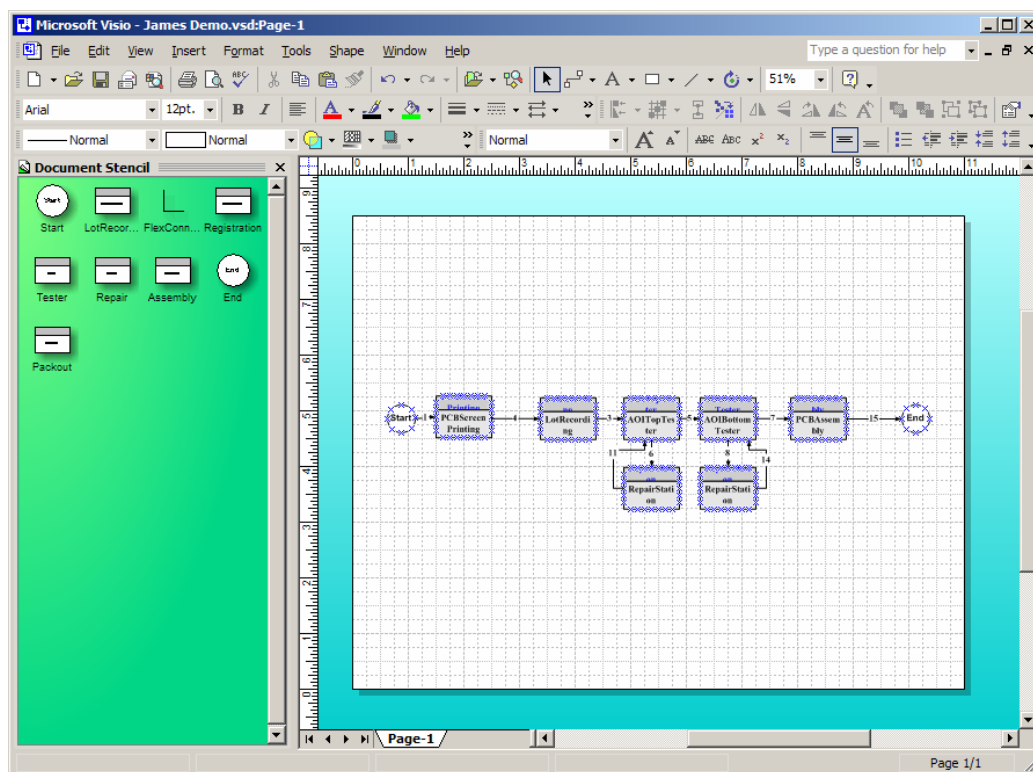
#### Most critical areas of value for Microsoft Visio



## ***Flextronics uses one tool—Microsoft Visio—for manufacturing diagrams across the enterprise***

Before adopting Microsoft Visio as its diagramming tool, many manufacturing design tasks at Flextronics were manual and time-consuming. Luis J. Vélez, a Flextronics System Administrator in charge of one of the shop floors said, “All process development was manual.” Omar Palacios, another system administrator said, “My tasks were to decide manually where the control points in the manufacturing process were.”

Now Luis J. Vélez saves 120 hours a month using Microsoft Visio flowcharts to analyze processes, assist in quality assurance testing, assemble the shop floor, and define rules for repair routes. Omar Palacios uses Microsoft Visio diagrams for process flow development, manufacturing route development, implementation, documentation, and planning. He says, “Now, with Visio, I can do in 30 minutes what used to take two days.” Process engineers at Flextronics use custom Microsoft Visio shapes to quickly design efficient process flows and production line layouts so they can simulate production lines that meet customer production requirements and eliminate potential bottlenecks before production lines are put in place. Flextronics enterprise solutions engineers use Microsoft Visio project schedules, data flow diagrams, process flow diagrams, and network diagrams to model the Flextronics Manufacturing Enterprise System (MES), which keeps track of operational information for existing production lines and uses control points to give management feedback on how smoothly a production line is running. These Microsoft Visio diagrams serve as an important communication tool across the enterprise to capture and maintain information for accurate IT reports distributed to various departments.



**Process engineers at Flextronics use process flow diagrams to visualize and simplify the manufacturing process.**

Software developers also use the Microsoft Visio platform to automatically model databases from the custom machine, control point, and station flow capacity shapes and data stored with the shapes in all of these Microsoft Visio diagrams, making it feasible to visualize data relationships, faster to implement databases, and easier to maintain a database interface to the manufacturing floor.

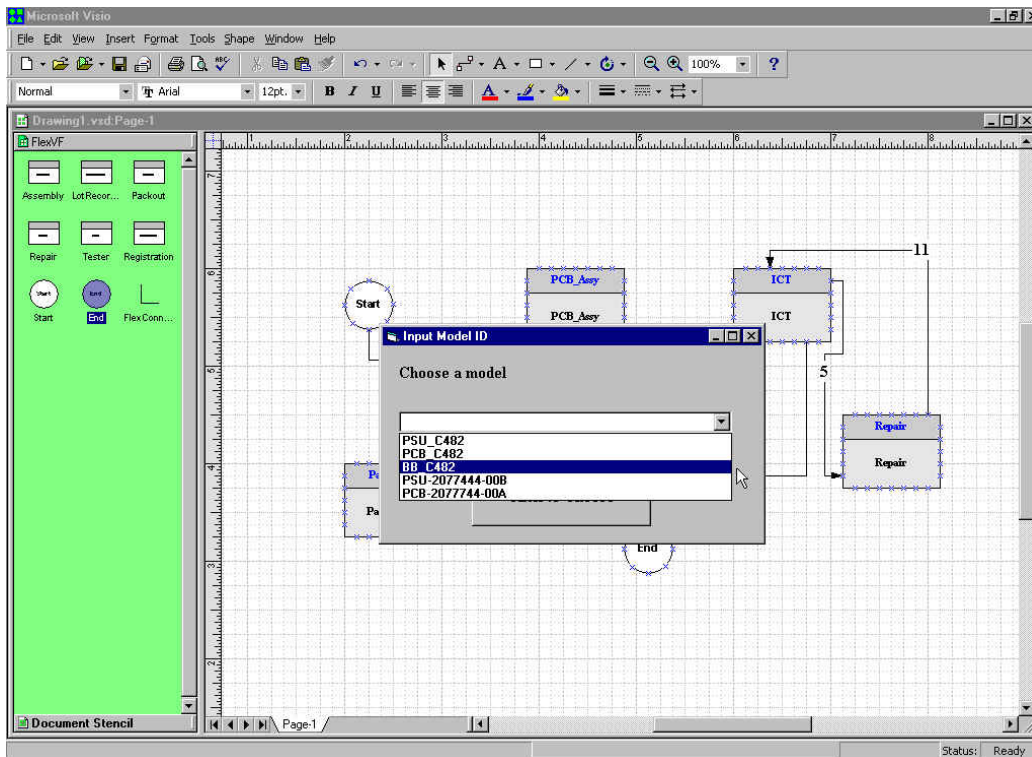
## ***Flextronics streamlines the manufacturing process using Microsoft Visio diagrams***

Since using Microsoft Visio, the Flextronics employees interviewed have experienced a 125% average increase in effectiveness (with a 40–400% range), a 109% average increase in efficiency (with a 15–400% range), a 72% average increase in clarity, and a 69% average increase in accuracy. Seventy percent of the Flextronics interviewees say Microsoft Visio is most valuable to them in their design tasks, followed by brainstorming and documenting tasks. Eighty percent of the interviewees create 2–4 diagrams each month, and many more during peak project periods.

Project Manager, Kulvinder Lall, who uses Microsoft Visio for his design tasks, comments that Microsoft Visio increases accuracy so he can “get it right the first time.” He works with project teams to create high-level process flow diagrams for management and goes into more detail with each department project team to map the logical aspects of the process. Then, he maps the physical processes for line workers and creates functional specifications that cover the flow of information from the production line to the databases for the developers—all using Microsoft Visio. When asked what benefits he associates with Microsoft Visio, he said, “Designing and mapping shop floor control systems from a physical standpoint: what users have to do at each step in the process.” He adds, “I can't imagine doing my job without Visio. Visio is a cleaner and easier way to create and present process flows. Once we're done with the process mapping, that's what we develop; the functional specifications are derived directly from the process maps.”

Manufacturing Enterprise System (MES) Lead, Gus Shahin, describes how he works with Microsoft Visio to quickly design and map processes: “I typically go to a production line and assess the process requirements, for example, process flow, quality, etc. I set up the process in Visio and determine where the control units need to be. I rework the process with the teams and use initial high-level diagrams to get management buy-in. I then develop the processes in more detail for implementation in the MES system. Visio is used as the design tool for designing and mapping the process.” When asked what benefits he associates with Microsoft Visio, Mr. Shahin says, “Designing a process is easy to do graphically. I can create high-level diagrams to convey the basic design for presentations to management and get initial buy-in. Then it is easy to increase the level of detail during the implementation process for each department.” He adds, “I have been using Visio for 3-4 years and it keeps getting easier and easier.”

Development Director, Roger Yang, has these comments on the productivity increases he has noticed since using Microsoft Visio: “Visio is very important in database and software design. It enables everyone to have input and makes it easy to communicate and share information. It greatly improves our productivity.” He associates these benefits with Microsoft Visio: “Open platform system - we are able to create and add lots of modules developed in Visual Basic. The objects are linked to the shop floor control system functions.” Software developer, Tony Zheng, describes how Microsoft Visio best supports his efforts: “We have developed our own stencils with icons, which represent categories of machines. There is a drop-down list to select the machine type and the information is saved to a database. This makes it very easy to model an assembly line and collect the data.” He says Flextronics chose Microsoft Visio because it saves a lot of development time.



Process engineers at Flextronics create diagrams using custom Microsoft Visio shapes, and then software developers use the diagrams and data to automatically model and visualize databases.

## ***Flextronics communicates globally with a universal language: Microsoft Visio diagrams***

Flextronics interviewees share network and directory service diagrams with as many as eighty people, organization charts with as many as forty people, and database and software diagrams with as many as thirty five people—all of whom may be scattered across the globe in different countries and speak different languages, so a diagramming tool that breaks down communication barriers is invaluable to Flextronics.

With written and verbal communication, different languages can present insurmountable and costly communication problems. One of the key benefits of using Microsoft Visio diagrams in a global corporation like Flextronics is that diagrams serve as a universal language, enabling the company to quickly communicate design changes and manufacturing processes worldwide with few or no misunderstandings at all. As the Senior Director of Worldwide Development/Infrastructure, James Simpson puts it, "Visio is a language crossing tool. Flextronics has manufacturing plants in different countries, and Visio presents a visual representation which is not subject to language and translation problems. With Visio, we can support rapid change."

### ***Additional Information***

For the latest Microsoft Visio product information, visit [www.microsoft.com/office/visio/](http://www.microsoft.com/office/visio/).

The interviews referenced in this document were conducted by META Group Consulting on behalf of Microsoft Corporation. The statements within this document report interview findings and offer insight into Microsoft Visio product usage, however, the qualitative statements are not made by META Group Consulting. These interview findings and statements do not represent a statistically valid sample and do not endorse Microsoft Corporation, its products, or services.

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