

# Gateway's E-fulfillment Throughput Multiplies with Think & Do

## Customer Profile



### Industry & Application

- Electronics assembly
- Material handling - sortation

### Location & Web Site

- North Sioux City, SD
- [www.gateway.com](http://www.gateway.com)

## Key Benefits

### Productivity

- Auto-sort conveyor speed increases from 30 to 90 cartons per minute
- Greater throughput eliminates off-site shipping of peripherals and improved order accuracy

### E-commerce Friendly

- Order tracking for customer inquiries decreases from 24 hours to immediate availability
- PC control system connects easily with enterprise database and mainframe computers

### Flexibility

- Control systems use Think & Do — whether built in-house or built by system integrator
- Reconfiguring SDS or other I/O networks is easy with Think & Do auto-discovery

THE Gateway™ computer brand has probably reached *icon* status in our culture. Aside from being known as one of the top computer manufacturers in the U.S., many will recognize their folksy TV/billboard ads with the computers in cow-colored boxes. Company CEO Ted Waitt began *Gateway 2000* back in 1985 in an Iowa farmhouse. Quickly becoming a major force in the mail-order computer business, Gateway sold their one millionth computer by 1993. Today, the \$9B+ company's success has extended to online Internet sales at [www.gateway.com](http://www.gateway.com). By now, more than 200 Gateway Country® Stores have arrived in cities all over, providing an enviable bricks-and-mortar presence to go with their online store. Gateway Country stores have no inventory — instead, you can visit one to test drive their computer systems and order a computer built just for you. Then, one of four manufacturing centers receives the order among thousands of other orders each day. Gateway's e-manufacturing infrastructure ensures you receive your order within about a week, delivered right to your door! Filling as many as a dozen tractor-trailers each day with those cow-colored boxes, their material handling infrastructure is something to behold. To help achieve the needed speed and accuracy, Gateway turned to Think & Do e-control software for their material handling systems.

### A Promise for Christmas

As with many online retailers the Christmas season presents perhaps the largest sales opportunity of the year — while putting the most strain on various business systems. In a bold promotional move last year, Gateway promised customers that they could order a computer by noon on the day before Christmas' Eve, and still receive it by Christmas! And — yes, that was for custom-built computers! More than a sales tactic, that *promise to deliver* demonstrated Gateway's confidence in their infrastructure that had been in the making for months and even years before.



*Strategic Gateway Country® Store mall location... perfect for holiday shoppers*

### Finding a Large-scale E-manufacturing Solution

Meet Rick Siders, Manager of Manufacturing and Industrial Engineering at Gateway's facility in North Sioux City, South Dakota. Having been with Gateway for over five years, he has worked on several projects in the manufacturing area. Part of the challenge in automating such a large operation is finding the right combination of automation vendors; no single vendor can supply every piece of the puzzle. A key turning point was Sider's attendance at a Smart Solutions Providers (SSP) seminar in Chicago. Led by Honeywell, SSP is a group of leading suppliers of open controls and conveyor components working together to create low-cost, easily maintained intelligent conveying solutions. Of course, it certainly helps to have a highly complementary product and service mix, along with a successful project track record. Siders discovered several key automation partners in the Smart

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4750 Venture Drive  
Ann Arbor, MI 48108  
on the Web—[www.thinkndo.com](http://www.thinkndo.com)  
by phone—(800) 722-6875

Solutions Providers group, including Think & Do Software for control and information solutions, Honeywell for Smart Distributed System® (SDS) control devices and networks, and Kim Controls, a large system integrator.

Siders describes his goals for automation: “We wanted to be able to do programming for the smaller projects ourselves, and not have to contract everything out. The first project we did with Think & Do was in the lidding area — that’s the step where we install the sides on the computer case. We still have to contract out large jobs to a system integrator, such as Kim Controls. But once the equipment is installed, we can maintain it with our knowledge of Think & Do.”

## Getting Results by Opening Bottlenecks

Preparation for the Christmas season started months in advance by tackling the largest bottlenecks in material flow. According to Siders, “Our original sorting system ran at about 30 packages per minute. After installing the new auto-sorter material handling system with Think & Do control, we can now handle 90 packages per minute.”

Another thing Siders wanted to address was a stopgap arrangement called a “dock merge.” Siders explains, “At 30 packages per minute, our main facility in North Sioux City only had capacity for the main computer units. For shipping peripherals such as printers, we had to do a dock merge. The peripheral items were shipped from a nearby facility and merged with the main computers at the shipper’s dock. The dock merge situation provided opportunity for error. Now that we have the shipping capacity here, we store all peripherals on site and ship them with each order. As a result, order accuracy has improved.”

“The ease of learning the control system led us to Think & Do. Plus, it runs on PCs, so that was a definite plus for us.”

— Matt Raveling



Gateway’s North Sioux City auto-sort material handling system — downramps ( center) deliver cartons to trailers through the dock doors (left)

## Auto-sort System Comes Together

Kim Controls served as the system integrator for the auto-sorter conveyor project. Mike Turner, Director of Sales and Marketing for Kim Controls, describes the project scope: “We installed nearly identical systems at the North Sioux City site which has 12 docks and at Gateway’s Hampton, Virginia site, which has 16 docks. Carton sizes range from large monitors to keyboards, and they are sorted for destination according to their barcode labels. The main sort belt runs at 375 feet per minute, making it our highest speed installation. That’s 90 cartons per minute continuous, 110 per minute maximum.”

An e-manufacturing environment requires real-time coordination between control platforms and business database systems. The auto-sort solution uses three PCs (Gateways, of course), in the following roles:

- **Control PC** - runs Think & Do flowcharts, which controls the conveyor belts, diverters, and other devices. Barcode readers connect to the control computer via a serial interface. This computer exchanges barcode data with the database computer.
- **Database PC** - contains a Sybase database for the dock destinations. The carton ID and zip code direct the lookup in the database tables. This PC returns the proper dock destination to the Control PC, updating tagname values in the Think & Do project. Each diversion of a carton is logged in the database.

- **Traffic PC** - handles shipping data communications with the dock-side terminals and handheld barcode readers. It also exchanges data with the database computer, making its data available to dock-side terminals.

This trio of computers must coordinate a full cycle of activities at the maximum 110 cartons-per-minute rate, or approximately once per 500 milliseconds on average. Each carton’s barcode (“2D” UPS Maxi-code) contains 26 fields of information that must be captured and acted upon each cycle. According to Turner, “We confirmed that the compatibility and speed was there between all the platforms, Think & Do control software, and the SDS network and devices. They gave us the deterministic system capable of reliably controlling this scan-critical application.”

The computers are also integrated into the total e-manufacturing system at Gateway. For example, the Customer Service department may want to know the location of a particular carton in the system. The corporate AS400 computers can poll the Sybase database via an Ethernet connection. Also, the dock-side terminals print a manifest for each trailer, listing all the cartons. An individual carton may be manually added or deleted from each trailer right at the dock.

During the equipment installation, Kim Controls had a control engineer at each of the two Gateway sites. Turner notes, “Working in tandem, they were able to develop the Think & Do project together.



*The main auto-sort controller — a Gateway rack-mount server running Think & Do software*

For example, they could share flowcharts, subcharts, and even operator screens.” This illustrates the benefits of modular, reusable flowcharts. Installation was complete in October at the Hampton site and in November at North Sioux City.

### Meeting the Challenge at Gateway

The daily operation of the auto-sort system is best described by Matt Raveling, Senior Manufacturing Engineer at Gateway. His introduction to Think and Do software was on the lidding station control project. In that project, he wrote flowcharts to control conveyor intersections as a sort of traffic director. Says Raveling, “The ease of learning the control system led us to Think & Do. Plus, it runs on PCs, so that was a definite plus for us. The SDS I/O system was easy to set up in I/O View (Think & Do’s I/O configuration tool); it

was logical and intuitive. AppTracker, was quite useful for debugging.” For project support, I did call a Think & Do application support engineer a couple of times. He seemed to know every answer.”

The new auto-sort system must be reliable, and Raveling puts it in perspective: “The conveyor system runs 23 hours per day, 7 days per week. Each of the three PCs has a warm-backup PC. Switchover to the backup PCs can be accomplished in less than 2 minutes; we just switch the SDS cable over. We have never had to use the backup system, but we did test it once and it worked just fine.”

Raveling sees benefits in addition to increased throughput for the new material handling system. “Prior to the new system, we would give the printed manifest to UPS, but their computers didn’t know what they had until they scanned the packages at their hub. We’re already 99% there in having our computer system talking directly with UPS computers. One of the things we were looking for was increased visibility for our customers. Before, if a customer called and wanted order status, it was a 24-hour wait to get the information back from UPS. Now, it’s live information; we can provide order status right when they call.”

### Conclusion

The Christmas season arrived just two months after the new system installation. Siders notes, “The new auto-sort system definitely helped us out during the peak



*PC cartons move by at a blur on the 375 ft.-per-minute conveyor*

holiday rush. We are looking at new applications in manufacturing to automate. In fact, we’re in the process of converting all our manufacturing automation to Think & Do control software and SDS I/O network and devices. One of our next steps is to capture productivity data at each site, and then share that information among all our sites on a Gateway network.” And right on cue, the new Think & Do Live! product adds that production monitoring and analysis capability for the next level of e-manufacturing productivity.

For Kim Controls, Turner concludes, “We feel we have another successful application with a visible customer. We are looking forward to the next challenge.”

For more information on how Think & Do can help solve your application, visit our website at [www.thinkndo.com](http://www.thinkndo.com), or call (800) 722-6875.

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*Conveyor delivers nearly-assembled PCs to lidding area*



*Gateway-designed control cabinet housing lidding conveyor controller*