

E-fulfillment Solution Doubles Throughput with Think & Do

Customer Profile



Industry & Application

- Material handling solutions
- Automated fulfillment system

Location & Web site

- Hayward, CA
- www.flostor.com

Key Benefits

Productivity & Savings

- Reduced from two shifts to one while increasing volume
- Better inventory control
- Accuracy in shipping improved

Connectivity

- E-manufacturing integration of control through Windows® communication features
- Integration with shipping manifest system through simple Visual Basic program

Programming Efficiency

- Think & Do's debug and simulation tools permitted control program testing/debug before actual startup
- 90% reduction in development time for serial barcode interface



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When people think of Berkeley's innovations in specialty food, two things come to mind: the birthplace of California cuisine, and Peet's Coffee & Tea, where the specialty coffee phenomenon was born. More than 30 years ago Peet's Coffee & Tea, a few blocks from the University of California campus, introduced the style of dark, roasted coffee. Its popularity in the San Francisco Bay Area grew into what has become an international reputation for quality. Peet's strong sales growth in the mail order/website business required more capacity, while maintaining their famous quality. This led to automating their roasting plant's packaging and shipping system using Think & Do control and Honeywell Smart Distributed System™ (SDS).

'Twas the month before Christmas, when orders jumped 250%...

Peet's went to FloStor Engineering, a local San Francisco area company, with their key automation requirement. "We needed a new automated fulfillment system for the busy December season, which can be 250% more than our normal weekly orders of 3,500 packages per week," according to Ray McKay, Peet's Mail Order Fulfillment Manager. The old fulfillment system was a manual operation, requiring two shifts to complete the orders for each day. So, just imagine what the holiday rush would be like! Yes, even Santa needs those extra cups of coffee in December to meet his worldwide demands. Now, the daily shipping operation is down to just one shift!

Given Peet's priorities, FloStor Engineering went to work on a new design. FloStor has a national reputation as a solutions-oriented company for material handling integration of complex automated systems. They were able to deliver Peet's Coffee & Tea an automated fulfillment system that provided multiple benefits above Peet's initial requests.

According to Neil Rowe, Peet's Director of Plant Operations, "Our newly automated fulfillment system enabled us to speed our packaging throughput to meet the demands of our busiest season. We have also experienced other key benefits such as tightening up our inventory system and improved accuracy to confirm that the customer always receives exactly what was ordered."

Ease-of-Use Requirement Leads to Think & Do

According to Chuck Ireland, Vice President of FloStor Engineering, "Most customers do not have the staff to maintain a PLC system. It was a business decision to use Think & Do and an intelligent device network. Most people understand flowchart control as opposed to the old PLC ladder logic. Think & Do is pretty intuitive. This lets customers solve their own problems. Alternatively, where support other than FloStor is employed, the third-party contractor can easily understand the system as well. My goal is to always give the customer viable options."

Ireland commented further, "Think & Do and Honeywell teamed up to bring in a great solution. We chose Honeywell's Smart Distributed System™ (SDS) as our I/O network for Peet's Coffee & Tea application." SDS is from Honeywell's



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Micro Switch Division. The SDS control network uses a single 4-wire cable for device-level connections that is CAN-based (Control Area Network). SDS devices have advanced device-level functions and preventative diagnostics. Think & Do's intelligent network driver automatically identifies the devices on the network and allows direct access to device attribute information and diagnostic data for flowcharts and HMI screens.

E-manufacturing with Think & Do

“One of the more complex areas of integration is that the new system had to work with Peet's existing shipping manifest software.” according to McKay. As you will quickly see, the demands of mail order and e-business are getting products to the customer effectively and efficiently.

Internet (www.peets.com) and telephone orders for Peet's Coffee products are received from homes and businesses and are fulfilled via the new automated conveyor system provided by FloStor.

After the Call Center closes, Web orders are downloaded and credit card orders are authorized. Then all orders are processed by Peet's custom legacy software.

An order file contains the theoretical weight per order, destination zip code, and transit time classification. This information is forwarded to the shipping manifest system, which selects the best-cost shipping method and assigns tracking/delivery confirmation numbers to each order. This file is transferred back to the legacy system so that the confirmation numbers print on the orders' peel-off address labels.

Product freshness is a priority at Peet's; all coffee grinding and roasting is done as orders arrive. When the daytime shift starts at the roasting plant, the fulfillment operators begin by retrieving printed 15-digit bar code labels from the printer. Each barcode label documents the order items, estimated weight and shipping information. According to that information, boxes are filled with the order's items such as

coffee, tea, and coffee accessories. The automation system designed by FloStor utilizes the barcode labels throughout the fulfillment process to:

1. Confirm the box is within expected weight limits (if it is outside the limits, the box is diverted and manually fixed by an operator prior to be sent to appropriate shipping lane)
2. Send the filled box to the appropriate shipping lane

Prior to actual shipment, each box is scanned again to verify the exact weight. The automation system collects this information and sends it to the shipping manifest software so that appropriate carrier payments are made according to the exact weight of each order.

FloStor's new high-speed automated system is called the FloShipper™ system. It is specifically designed for automated parcel handling in fast-growing direct Internet sales operations such as Peet's Coffee & Tea. The three major aspects of the automation system are:

- Automation system using Think & Do and SDS intelligent I/O network
- Human Machine Interface (HMI)
- Interface to shipping manifest system

Conveyors That Do More Than Convey

The high throughput requirements of the conveyor system meant the automation system had to remove the manual labor bottlenecks. Peet's McKay found them to

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be barcode scanning by the operator and the manual taping of boxes. Therefore, a barcode scanning station and automated box taper were part of FloStor's solution. These devices along with the in-line weigh scales were connected to the automation system via serial inputs.

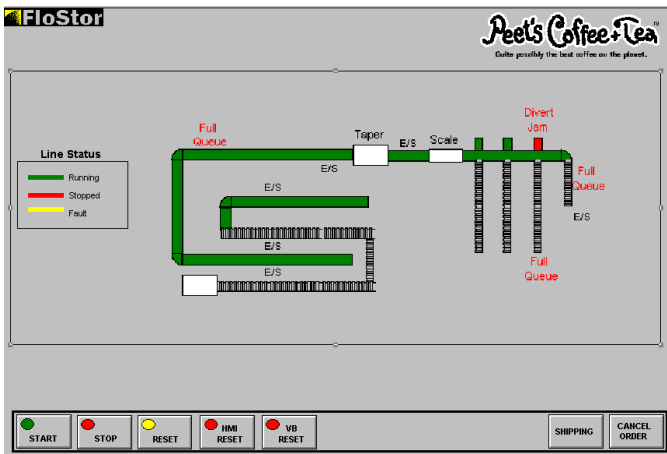
Additionally, the PC-based automation system included a SDS protocol network of about thirty 24VDC-powered control devices running on two SDS nodes. The devices included motor starters, photoelectric sensors, proximity sensors, input and output modules, E-Stop pull cord switches, solenoid valves and valve banks. FloStor Engineering had contracted the control programming to John Skates, Senior Project Engineer with Banziger Banks, Inc. According to Skates, “Think & Do's flowcharting tools are extremely effective for material handling applications. I probably saved 50% in programming time alone as compared to using a PLC solution.” Because Think &

Do runs on a PC, it comes in handy when integrating the system. “Think & Do has quick and easy serial connectivity compared to a PLC system,” Skates continues. “If a PLC were used for this system, the serial modules alone would have cost another \$2,000 in hardware, and would require eight hours of programming. With Think & Do, however, we had all four serial data communications within a half an hour with no extra hardware — that's what I mean by ‘quick and easy.’”

Other Think & Do features that Skates mentioned as



*FloStor's material handling installation at Peet's Coffee & Tea
(control station at center)*



HMI Overview screen of conveyor system, using ScreenView's logic-dependent colors for alarms

helpful during the project's testing were the AppTracker debugging tools and simulation flowcharts. AppTracker is a multi-paned application debug tool that is designed to give the programmer a clear picture of the whole project. It indicates the active flowchart with active data values and the status of subcharts. With its effective use of color, you are quickly able to understand I/O and control logic status. "With both AppTracker and the simulation tools, I was able to pre-commission (test) flowcharts prior to start-up." Skates noted. Therefore, the start-up time was quicker since the code was well debugged and tested.

Better HMI Screens, for Peet's Sake!

By using the new HMI screens, Peet's operators now can quickly identify if something is wrong and fix it. According to Neil Rowe, Peet's Director of Plant Operations, "Change for any person is not always easy. But after our operators became comfortable with the system including how to use its graphical screens, they wouldn't have it any other way."

The HMI layout consists of a Main Menu, Production Information screens, and System Diagnostic screens. The operator can enter allowed weight variances on the data entry screens.

The graphical interface screens allow the operator to view the following:

- Runtime and alarm status for each conveyor
- Production statistics such as weights, lane assignments, and scan status
- Package throughput, weights and label data
- Emergency stop status
- System diagnostics for online devices, timers, and barcode management

As a controls programmer, Skates especially likes Think & Do's Human Machine Interface editor, ScreenView, which is well integrated with the flowchart tools. ScreenView allows access to the same list of application data names as the flowchart tools uses, saving development time by avoiding the need for retyping data names. Compare this to other automation solutions with separate HMI and control; the designer would have set up the HMI package and possibly recreate another database for the HMI. Skates points out another major benefit of Think & Do's integrated HMI: "It is really handy using Think & Do because I am able to modify the HMI screens online. As compared to other HMI packages — precious time is wasted because they require a complete offline recompiling step for a change to be implemented."

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Hot Coffee to Go...

As mentioned earlier in the article, the shipping manifest system created the barcode labels used to fill the customer's order and estimate the package weight. Important data is collected from the automation system and then sent up to the shipping manifest system. An in-line weigh scale (built into the conveyor) sends the exact weight of each order to the shipping manifest system. Then, a Visual Basic (VB) application calculates appropriate shipment costs for the carrier. According to Skates, "The Visual Basic executable starts when the Think & Do project starts (from a function block in a flowchart — very cool). The Visual Basic application then sits and waits until Think & Do calls it to say 'I have some data; come take it from me.' Actual calling or handshaking is really easy, as VB can look directly at Think & Do's data tables (just as cool). This makes for really easy handshaking. The Think & Do flowchart turns on a flag, Visual Basic does its stuff and turns the flag off when it is done, and then waits until next time."

Support for Any Problems Brewing...

Think & Do's technical support staff received rave reviews from all. FloStor's Ireland emphasized, "From the start, Think & Do and Honeywell up-front support convinced me that I made the right technology decision. If someone helps me and is committed to solving my problems, I will continue to buy from them." The controls programmer, Skates also emphasized, "Think & Do's tech support was brilliant. We had some obscure serial communications problems during start-up that was the result of hardware issues, and they were able to solve the problem."

Peet's Coffee & Tea's new automatic fulfillment system has met their primary objective of higher throughput and met the challenge of the busy holiday season. Another benefit is the improved accuracy of shipments. Diagnostics help operators to quickly resolve problems as they occur. Even the inventory system is more efficient. Whether ordering by phone or the Internet, Peet's Coffee & Tea is ready to serve you throughout the year.

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