

## Direct Digital Manufacturing Allows Quick Production of Custom Products

*“The machine paid for itself within months of purchase.”*

–Bill Thomas, ScriptPro

### Real Challenge

ScriptPro (Mission, KS), a manufacturer of automated pill-dispensing systems for pharmacies, was one of the early adopters of direct digital manufacturing, having employed the process for several years before it became a more widespread technique.

ScriptPro uses a Fortus 3D Production System to manufacture selected parts for the pill-dispensing systems. Automating the vial (i.e. pill bottle) filling process allows pharmacists to spend more time counseling patients. And prescription wait times are reduced, leading to greater customer satisfaction for the pharmacy. The system communicates with the pharmacy computer to fill, label, and deliver up to 150 prescriptions per hour. One such system, the SP 200, is expected to fill from 60 and 80 percent of the prescriptions in most pharmacies.

The machine comprises three sections, the robotics cabinet, the electrical cabinet, and the control center. A robotic arm picks up a vial, takes it to the dispensing cell for filling, then places it on a conveyor. The conveyor stops long enough to add the label, then moves the vial into a collated-collection station that places the vials in order by patient name or status.

One of the challenges in designing and manufacturing the robotic dispenser was the large variety of vial sizes available to pharmacies. Although most pharmacies use just a few vial sizes for the majority of their pills, they may select from several manufacturers’ products, which means that ScriptPro’s machines must support a variety of vial types and be customized for each pharmacy.

The most critical component of the SP 200 is the bezel that accepts the vial. The bezel is designed so that the user cannot put the wrong vial into the machine. Each SP 200 has three vial receptacles and six bezels to accommodate a variety of vial sizes.

### Real Solution

ScriptPro’s Fortus system employs FDM technology to produce parts. Using FDM, each bezel is manufactured to precise tolerances to accept only one vial size. According



Image 1: Pharmacist using ScriptPro SP 200 Automated Pill Dispensing System.

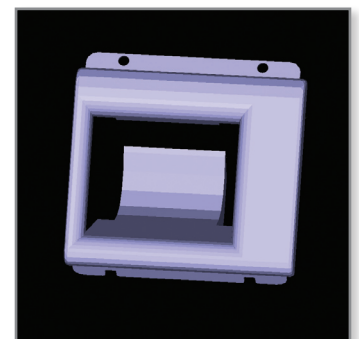


Image 2: CAD image of a bezel for the SP 200. The machines have a variety of bezel styles to support various vial (pill bottle) types. Machines are customized for each pharmacy.



Image 3: Some of the machine’s bezels are produced via direct digital manufacturing because the custom configuration calls for low volumes of these parts.

### How Did FDM Compare to Traditional Processes for ScriptPro?

Process	Cost Estimate	Lead Time
I.M. Tooling & Production	\$31,650	60 days
FDM Direct Digital Mfg.	\$6,750	1 day
<b>SAVINGS</b>	<b>\$24,900 (79%)</b>	<b>59 days (98%)</b>

to Bill Thomas, VP Manufacturing for ScriptPro, "Once we were through with the prototyping stage, we immediately began to use the Fortus system for Direct Digital Manufacturing (DDM) of the bezel. Not only were the tolerances in line, but there was little to no required post production work, like sanding or painting. We produce the vial bezels, wash them, and install them on the machines. Aesthetics are very important, and the surface quality is excellent."

Although ScriptPro had limitations due to the cabinet size, the bezel was easily designed to fit the space available. It was also designed to be extra rugged, so that it could prevent a person from forcing the wrong size vial into the bezel. So far, 56 vial types are supported by ScriptPro. "Since we don't know which bezel will be needed for which machine until it is ordered, using FDM for direct digital manufacturing has saved us the cost of producing stock, and it can produce parts within a day or two," says Thomas.

Although the per-part cost is higher with direct digital manufacturing, the elimination of machining and tooling results in significant overall savings. Based on ScriptPro's median annual machine production volume, it estimates that bezel production would cost \$5,100 more with direct digital manufacturing— however, the elimination of tooling would save approximately \$30,000, for a net savings of \$24,900, or 79%.

"If we had gone the traditional route of designing the part, then designing the tooling to build the part, then having the part injection molded, it would have required time and money every time we made a change. As it is, we made changes even after the first components were manufactured, at no additional tooling or molding costs." Plus the company can easily adapt to other vial manufacturers' products within a minimum amount of time.

"Flexibility is, by far, the strongest feature of the Fortus system," says Thomas. "We can experiment with product design, test it, and make changes without having to go to tooling. And then we can start getting production parts within a few days, versus what could extend into months. Having no outside vendor to deal with is another benefit of DDM."

"We had a savings of about \$30,000 on engineering time and tooling for the bezel alone. Add in the other parts, and the machine paid for itself within months of our purchase."



Image 4: Loading vials into the pill-dispensing machine. Each bezel allows only the correct vial type to be accepted.



Image 5: A robotic arm picks up a vial, takes it to the dispensing cell for filling, then places it on a conveyor.



Image 6: After labeling, the conveyor moves the vial into a collated collection station

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