

Cord knots? Not with CorDotz!

We've all been there—on hands and knees under or behind a piece of furniture, wrestling with a tangle of cords looking for the one that needs to be plugged, unplugged, or otherwise manipulated. In calmer moments, many of us have wished that someone would come up with a way of sorting out the mess. Micah Maraia, being an experienced industrial designer, actually invented one.

The patented Dotz CordIdentifier™ is a small, colored plastic bubble that snaps onto the end of a power or connecting cord. It displays, through a clear window, an icon showing the appliance or electronic device that's on the other end of the cord and can make your stay behind the couch or under the desk briefer and a lot less frustrating (see Figure 1). The cord identifier is easy to use; just snap it open, pop the appropriate paper icon out of a perforated sheet and into place behind the plastic window, and snap the cord identifier closed on the end of the electrical cord.



Figure 1: Small plastic bubbles snap onto power cords for easy identification

“As a designer, I’m always looking for ideas,” says Maraia. “My job is to find solutions where others see problems, but the idea is just the beginning.” While the concept of the cord identifier may seem simple, the process of developing it was not. From concept to market, Maraia spent three years on the project. One of his biggest challenges was creating a fully functional part that could be economically produced in an injection mold.

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Beginning with sketches, Maraia used SolidWorks software to produce 3D CAD models. “I had developed detailed visual representations but still needed functional prototypes for testing and initial marketing. I looked at SLA and other prototyping methods, but features like the living hinge can only be produced by injection molding. Proto Labs’ rapid injection molding service, Protomold[®], provided the capabilities I needed—real molded parts, quick turnaround, and affordable prices. Their ProtoQuote[®] online quoting and design analysis can be fairly aggressive in pointing out potential problems, but it’s fast and helpful and lets you ascertain that your 3D CAD model can be molded.”

“I had two prototype versions of the cord identifier made at Protomold. The first was molded in non-clarified polypropylene supplied by Protomold. The second version, produced after I made some design modifications, was molded in clarified polypropylene, which I chose for its quality and appearance and purchased and supplied to Protomold.”

“It’s an extremely well-designed part,” says Proto Labs Engineer Dave Nyseth. “The latch on the left side of the part looks like it would require us to include one of our typical side actions, but it is actually formed by a pass-through core from the A-side mold half. As the mold closes, that A-side core forms a shutoff against the surface of the B-side mold half. The three-degree draft of that feature prevents entrapment of the mold feature as the mold opens, forming the side-facing opening without the use of a side action—always a nice option when possible. The draft also keeps the mold surfaces from abrading one another as the mold opens.”

“The living hinge is also very nicely done,” says Nyseth. “Some living hinges don’t precisely align their bends, leaving the meeting of the hinged parts uncertain. On this part, a wedge-shaped ridge along one side of the hinge fits perfectly into a corresponding groove on the other side of the hinge. This ensures precise alignment of the two halves of the part and helps align the clip on the right half of the part with the mating catch on the left.”

According to Nyseth, one of the trickiest aspects of this design is the articulated parting line, along which the two mold halves meet. “This is about as extreme as it gets,” he says. He points in particular to the “teeth” along the edges of the part. These are designed to clamp onto cables of varying sizes to keep the cord identifier in position once it has been put in place. They were designed to flex slightly, to hold the cable firmly without damaging it.

“The parting line goes up and down following the contours of the teeth, and there’s some very smart design that allows such a complex structure without interfering with molding or ejection,” says Nyseth. “The teeth are spaced and drafted properly to allow the milling tools to cut the relatively narrow mold features that will form them and to allow the finished part to be cleanly ejected from the B-side mold half. The A-side mold surface is flat and smooth where it forms the outer surface of the teeth. The spaces between the teeth are formed by protrusions of the B-side mold half, which shut off against the surface of the A-side mold half. These shutoffs are drafted to prevent flash, allow clean mold opening, and prevent damage to the mold.”

“The designer’s choice of polypropylene resin was also a good one,” says Nyseth. “It provides the clear window for the paper icon, but it also flows well, which is important in a complex design like this one. And it makes an excellent living hinge (see Figure 2). We gated the part



Figure 2: Polypropylene resin permitted transparency as well as good flow.

at the clip and had the resin flow all the way through the hinge to the far end of the part. Some resins would not have flowed well through the thin area of the hinge into the thicker area beyond, but polypropylene does. Resins that don’t flow as well might have required two gates to fill the thick areas, in which case the two mold flows could have met at the hinge, which is exactly where you don’t want a knit line. In this case, the direction of resin flow across the hinge aligns the polymer chains to increase the hinge’s strength and longevity. It’s just one more way that this piece shows the complexity that be achieved in a lower cost mold.”

The sophistication of the cord identifier’s design was developed over the long course of development. “Much of the design came from CAD modeling and existed before the first prototype,” says Maraia, “but I also made some significant changes based on the first prototype.” The second prototype was easier to open and more refined both visually and functionally.”

Maraia considers himself fortunate in being able to develop the product, the packaging, the website, and related materials himself. Outsourced, they would have cost tens of thousands of dollars. The product is being sold both direct, through the company’s web site, www.cordotz.com, and through retailers including Office Depot and Crate&Barrel. “Because it’s color- and icon-based, it’s ideal for international sales,” says Maraia, and it is already being sold in the UK, Germany, Japan, South Korea, Australia, Turkey, India, and Canada.

“We are continuing to develop related products and now offer patented and patent-pending CordStraps™ and CordWraps™,” says Maraia. “We’ve got a great team and we’re working hard to develop, maintain, and merchandise a brand built around quality products that meet a need.”