BUSINESS NIAGARA

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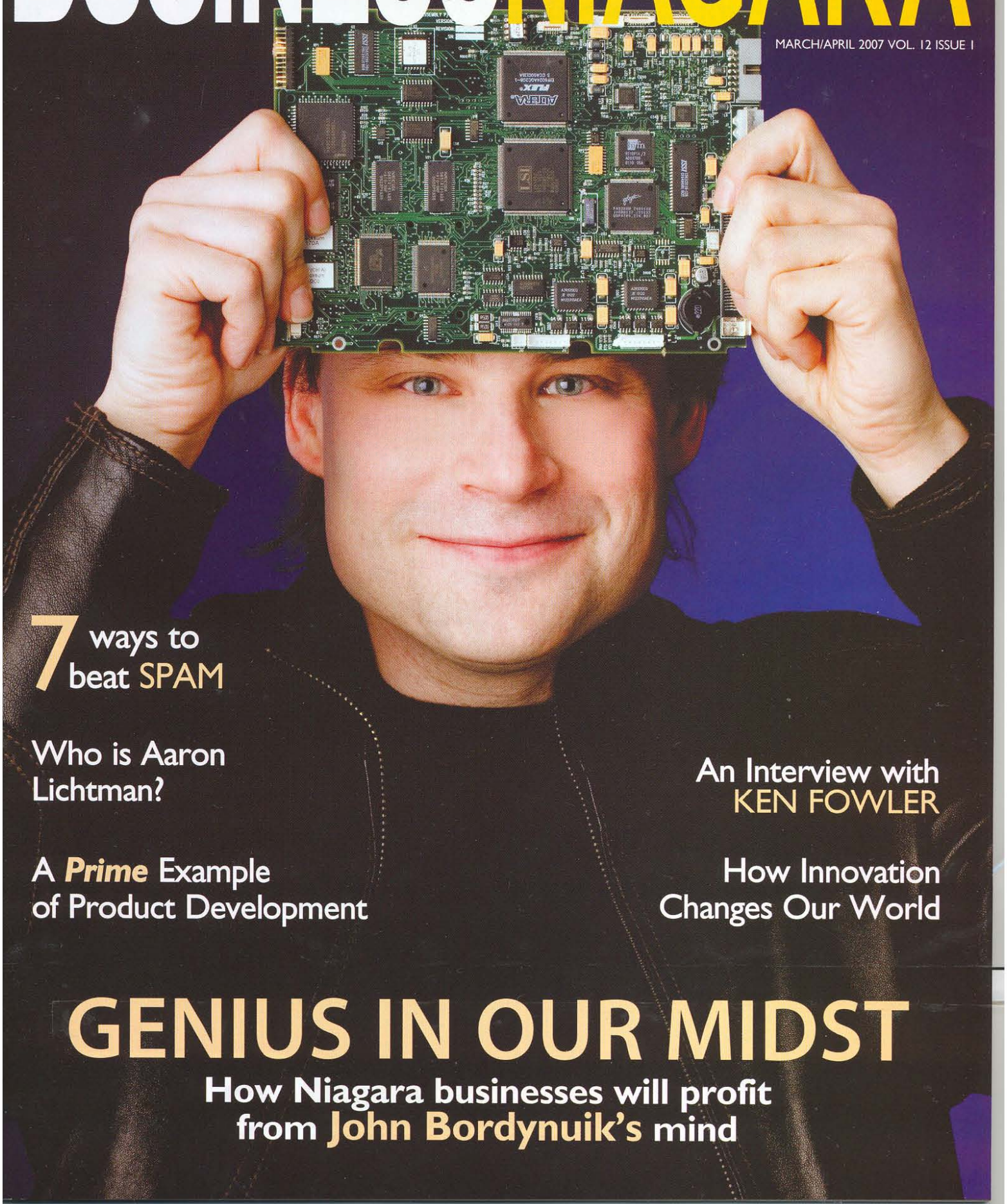

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How Niagara businesses will profit from John Bordynuik's mind

ROBOTICIST, CPU ARCHITECT AND INVENTIVE GENIUS JOHN BORDYNUIK IS SECURING NIAGARA'S MANUFACTURING FUTURE

By Luigi Benetton · Photography by David Haskell

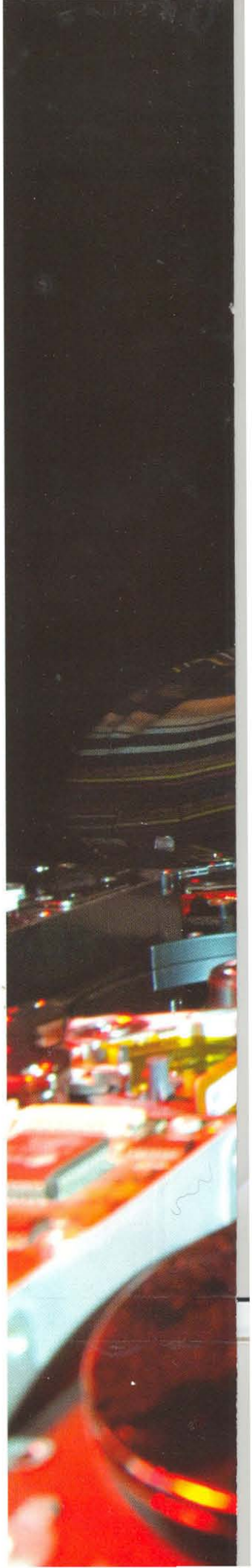
In his Portage Road warehouse, John Bordynuik leads me past a shelf holding his remote control submarine towards skids piled with 30,000 pounds of computer backup tapes, shipped here by the Massachusetts Institute of Technology (MIT). Every bit of information on these tapes – two terabytes in total – is part of a thesis, a technical journal or other priceless intellectual property generated by the venerable institution from the 60s to the 90s.

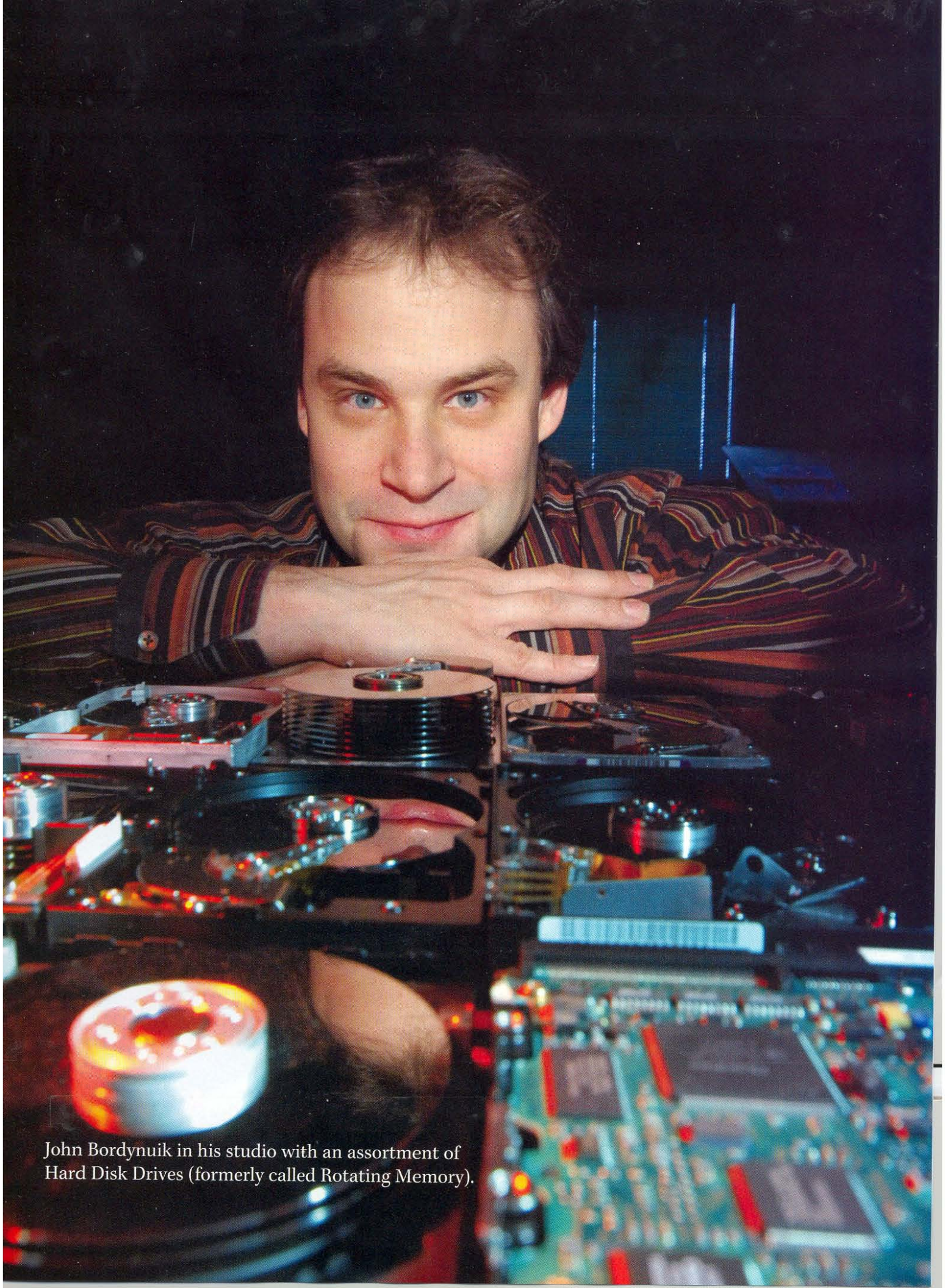
MIT wrote backups onto seven- and nine-track reel-to-reel tapes reminiscent of those in the movie *The Italian Job* – the original version, starring Michael Caine. Unlike the movie, though, much of the data on the tapes wasn't migrated to new systems. There are no other copies of the data on these tapes, so when the institute found it couldn't read them anymore, it launched several attempts to recover the data. Each one failed. In 2002, MIT heard about Bordynuik and contacted him. Having already developed hardware for this purpose, Bordynuik started spinning the tapes, to the amazement of those who already tried.

But data recovery is a personal interest. Bordynuik doesn't just recover intellectual property. He creates it. In addition to having the world's largest engineering information archive on-site, Bordynuik spends much of his time incorporating or redesigning electronics in his clients' products to significantly reduce their cost and keep them highly competitive.

To illustrate, Bordynuik shows me seven circuit boards extracted from a client's electronic device. Seven boards is six too many for his client, so he and his team of engineers created one board that does the job of the original seven. Topping off the package with industry-standard USB or Ethernet connectivity, Bordynuik's client gets a more efficient product that costs substantially less to make. And where engineering companies take half a year or more to develop technology like this, Bordynuik usually develops his bulletproof designs in under a month.

For example, www.JohnBordynuik.com lists some of the technology that Bordynuik has created in the past, including a dirty bomb detector that he somehow squeezed into a key fob. He was issued a patent for this invention this past October. By extension, Bordynuik wants to enhance the future of





John Bordynuik in his studio with an assortment of Hard Disk Drives (formerly called Rotating Memory).

Niagara's manufacturing sector by integrating intelligence into existing products.

Projects like this may prove a godsend to the close-knit Niagara community of ISO-accredited companies. "If Niagara's products are more intelligent and cost less to produce, that will give [assemblers] quite a competitive advantage and keep jobs here," he says. "Niagara has a substantial infrastructure of highly experienced assembly and manufacturing companies that are slowly eroding away. The high-paying assembly and skilled trade jobs and factories will stay in Niagara by incorporating highly advanced technology in our existing products."

Meanwhile, Bordynuik's reputation as a data recovery expert keeps his sideline cooking. Certain makes of tapes become sticky over the years, so Bordynuik bakes them in ovens of his own design. Once hardened, his custom tape transports can read them without mangling them, and Bordynuik copies their contents onto modern media. Given the results he brings and those he's shooting for, Niagara's business community might well ask: how does one bake more John Bordynuiks? The recipe is not conventional. It calls for, among other things, business experience at an early age, a passion for robotics, big iron and untold numbers of blown fuses. It also helps to have an IQ that has been measured at 170 (a genius level higher than Einstein's).

Born in Niagara 37 years ago, Bordynuik grew up in Fonthill. By the time he started kindergarten, he had attained fourth-grade literacy and at age seven and ravenous for reading, Bordynuik dived into the Electronics TAB Book Club. It was in the pages of the ambitiously titled *How to Build Your Own Working Robot* that he found his calling. However, he soon realized these contraptions, like "Buster" in his book, were expensive to build and called for many parts that weren't locally available. His father, John Sr., started talking to salvagers, local companies and anybody he knew with a lead to the kind of equipment his son longed for.

Soon, local companies were giving Bordynuik the mainframe computers that they would write off every two to five years. He scored the "big iron" of the day from technology leaders like Honeywell, IBM and Digital Equipment Corporation, some of which would overwhelm both the basement and the electrical system of his parents' house. He often dragged computers from one outlet to another whenever he blew a fuse. Along with big iron came big books – manuals, schematics and operations guides. To learn from his systems he had to keep them working, and that meant repairing them at the component level. The aspiring roboticist had to navigate thousands of parts in the leading computers of the 60s and 70s, using manuals that weren't publicly available, not even in universities.

"I wanted to make a robot as intelligent as possible," says Bordynuik, so by 10 he started programming in assembly language, the level above the ones and zeros of binary that computers understand, progressing to simple systems and interfaces at age 12. He studied the architecture in computers themselves, and later supplemented his knowledge by contacting the engineers who designed the devices, most of whom welcomed his questions.

Working part time since Grade 8 repairing electronics at a local shop, the student soon became a part time computer consultant. Bordynuik wrote Grimsby Hydro's mainframe security system and the school's accounting system, among others, as a teenager.

Years later he would get his 15 minutes of fame. In 1989, he told his bank he found $1.2 million in his account that he didn't remember depositing. Bank officials in Toronto insisted there was no mistake and the money belonged to him, while staff at the local branch scrambled to reconcile more than a million missing dollars. Bordynuik stuck with his story, which soon made headlines across Canada. Papers proclaiming "Honest John Returns $1.2 million" caught the eyes of influential Ontario Legislature IT staff. However, they couldn't locate him before he started first year physics at Brock University. They did find him at the end of first year, though, and lured him out of Niagara to work on provincial computers in Toronto. Bordynuik's initial system administration responsibilities soon evolved into research and development, all the while fielding calls from government officials anxious to recover data from crashed hard

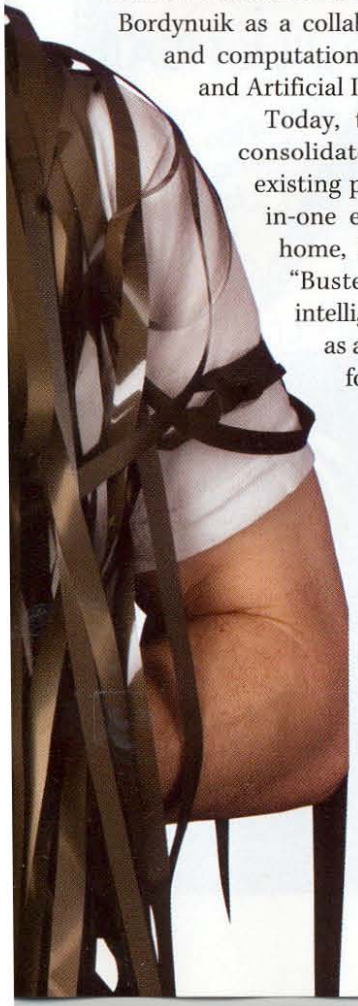
Bordynuik with a ½-inch magnetic reel-to-reel computer tape backup.

drives and ruined tapes that nobody had backed up.

Queen's Park provided Bordynuik with first hand dealings in politics and business during a 10-year public sector career and taught him things he never read in manuals. Also, a substantial training budget opened doors to where he earned his designation as a CPU architect. Meanwhile, he both saved and added to the collection of big iron from his youth. These non-Y2K compliant machines, seemingly destined for scrap heaps, appealed to a new kind of buyer.

"Just before the year 2000 boom, all the technology billionaires were looking for the computers that they developed with at university because, really, that's what made them all their money," Bordynuik says. For example, in 2000, Bordynuik listed a 1972 PDP11/35 computer on EBay for $200 with this promise: "I'm not going to claim it's a working computer; I'm going to prove it. Click here and you can connect to it." Among the 4,000 people who connected that weekend was Paul Allen, co-founder of Microsoft, eventual buyer of many systems, and valuable referral that led to a 2002 stint for Microsoft.

Another unusual door opened in 2003, when MIT signed Bordynuik as a collaborative researcher in their math and computation group of the Computer Science and Artificial Intelligence Laboratory.



Today, the entrepreneur optimizes and consolidates processors and circuits in existing products, like the seven-processor-in-one example he showed me, while at home, his sons are building their own "Buster." The drive towards more intelligent parts dates back to his days as an amateur roboticist, but today his focus is much different – keeping jobs in the Niagara region. Not that offshoring is taboo: Bordynuik himself deals with Chinese manufacturers. But he points to the rising labour rates in the world's most populous country as evidence that the playing field will level out. He also believes outsourcing rarely fits the bill when a firm makes highly specialized products. "Let's use Asia for what they're really good at, which is manufacturing individual components," he says. "[But] final assembly in China isn't always practical. If quality control is a serious issue, it should be done here."

The quality of the first several thousand units of a product concerns him most, since Bordynuik shuns generic off-the-shelf parts. He custom-builds the main processor and optimizes everything else on a board specifically for the task at hand. His clients' engineers don't. They have a penchant for reaching into the 'Lego' parts bin for general-purpose processors and other generic bits to meet the specifications of a given design. Manufacturers often find the results fat and expensive to both produce and operate, so Bordynuik makes his own 'Lego' from scratch to fit the product.

Bordynuik also integrates most of his design into one piece of silicon that supports remote updates, expansion, and the ability to support value-added options in the future. If the product can't be upgraded remotely via the Internet or by the user then it could be rendered obsolete by a competitor's, he says. "We redesign products to use our small, highly robust parallel processing real-time cores that are far more flexible than generic components ... I can do as much with 1,000 transistors as others can do with 65 million. Fewer transistors mean less power draw, less cost, less problems."

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Bordynuik builds strong ties with his clients. "It's not just: 'Here's your product redesigned,' we design and supply the assembled electronics and therefore have a small stake in our customer's product. We want the product to take significant market share and continuously work to achieve that."

Next on Bordynuik's to-do list is battery production, a natural extension of product optimization work. His battery development group custom-designs and tunes lead-acid models to power devices that draw between two and 10 amps (larger than notebook PCs and smaller than electric vehicles). From hospital medical exam carts to mobile pricing and inventory workstations in grocery stores, users want to work a full shift without having to plug in the device, an annoyance that counters the portability that makes it attractive in the first place.

Bordynuik's bottom line: to make highly stable and robust products that cost less, are more intelligent and more competitive – and keep jobs in Niagara. He explains the business benefits to his clients, and when they pull out their calculators, Bordynuik claims, "the savings are impressive."

"Anyone can make plastic or steel. Can you make intelligent plastic or steel? That's the competitive advantage now."**BN**

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