

CUSTOMER: **Ross Custom Switches** □ 45 Church Street □ Norwich, CT 06360 □ 800.331.1395 □ www.rossswitches.com

## Making Tracks ... at High Speed.

### INDUSTRY DEFINED:

In 1900 a marketing genius named Joshua Lionel Cowen talked a store owner into carrying one of his odd gadgets — a toy train that looked like a brick on wheels that ran around an oval track by the power of battery. The set sold well and by 1907 Lionel trains had become more realistic and had increased competition from brands like Voltamp who introduced a 2" train that ran on AC. But, Lionel quickly converted their sets to AC and retaliated by dubbing their 2 1/8" format "Standard Gauge". This marketing tactic worked well and Lionel soon became the standard of excellence with the quality of their future sets instilling a confidence that remains to this day. With a firm market share by 1915, Lionel addressed increasing pressure for size standardization by introducing an O gauge product with 1 1/4" track.

Today, regardless of gauge, the industry offers a wide range of accessories and hobbyists demand realism and functionality at a competitive price. As a result, most companies have moved their production to China in order to keep costs down and profit margins up. But, Ross Custom Switches in Norwich, CT found a way to keep production of their custom track switches and turn-outs in the US while at the same time increasing margins. This case history conveys exactly how they did it.

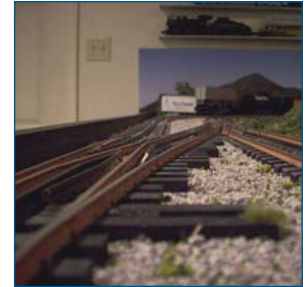
### CHALLENGE:

Used to switch model trains from one track to another, Ross Custom Switches are certainly small parts that must be produced accurately in order to live up to the company's derailment-free promise. The switches are designed by owner Steve Brenneisen who pioneered a proprietary Tie-Lock™ system that features a main component milled out of engineering grade Delrin. For years, these tiny parts, measuring 2" x 1" x .25", were outsourced to local shops for machining. But, the high cutting force of their conventional CNC machine made it difficult to hold the small part securely during production. So, they manually set-up and clamped an oversized piece of substrate on the machine bed to produce 8 to 10 parts per hour, one-at-a-time. This yielded 8,000 parts per year at a cost of \$8 each resulting in an annual production cost of \$64,000.

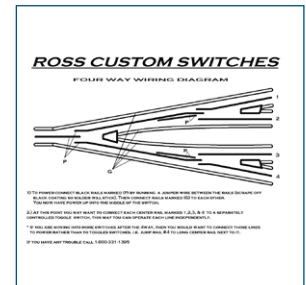
According to Brenneisen, this process became a challenge because, *"Getting parts in time was a problem and the cost of production was very high ... it was getting more and more difficult to compete with the low cost products being made in China."*

### GOAL:

*"I wanted to have total control — to manufacture parts in house, quickly and with less cost — and not have to depend on other shops for production."*



The model train industry is comprised of hobbyists who demand realism and functionality at a competitive price ... so much of the production has moved to China.



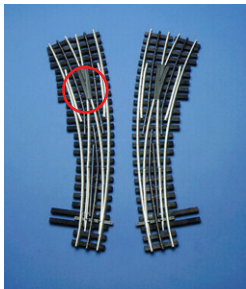
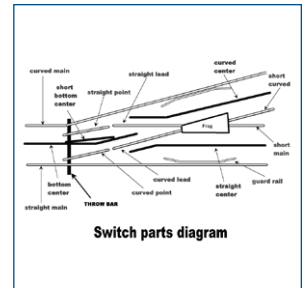
Ross Custom Switches, Norwich, CT turned to DATRON and found a way to stay competitive.



Steve Brenneisen, Ross Custom Switches President, who pioneered a proprietary Tie-Lock™ system that features a main component milled out of engineering grade Delrin.

**SOLUTION:**

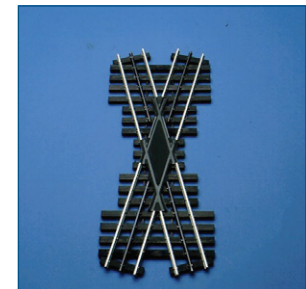
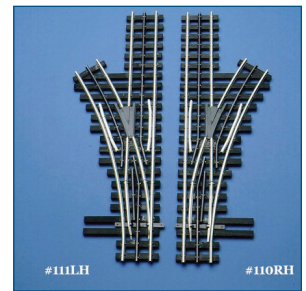
Frustrated with outsourcing, Brenneisen attended the 2003 EASTEC trade show with his sights set on leasing the same CNC machine that his vendor was using to produce the parts. With a purchase order in hand, he headed to that company's booth only to find the leasing person had gone to lunch. With time on his hands, he casually walked the isles of the multi-building show until he came upon the Datron Dynamics exhibit. There he saw his future — tiny parts being held to the bed of a DATRON M35 High Speed CNC Machine with Datron's proprietary Vacumate™ workholding solution. Since Datron machines feature a high RPM spindle, they produce a low cutting force and minimize side load — so even a part with very little surface area can be held securely on the vacuum table. *"There was no clamping or fixturing and the set up time was seconds instead of minutes — I immediately saw how this translated to my production challenge and how it would impact cycle time,"* said Brenneisen. What he would later find is that Datron's expertise in batch-machining



**Ross Custom Switches**

Left: Parts 161LH & 160RH red circle indicates location of part made with DATRON

Below: Enlarged view of part made with DATRON



would further impact his bottom line. During a benchmarking session, Datron Vice President, Bill King programmed the M35 to machine the Ross part 50-up. What's more impressive is the fact that the 50 parts were completed in an hour — the same amount of time that it took Brenneisen's vendor to produce 8 to 10 parts on the other CNC machine. Needless to say, he walked away with an M35 of his own.

**RESULTS:**

With the DATRON M35, Ross Custom Switches brought all production in house and maintains a 500% increase in throughput — 50 parts per hour compared to 8 to 10 parts per hour produced on the other machine in 2002. Through this process, the cost per part went from \$8 each to only \$.50 each providing a 16 times higher profit margin (a 1600% increase). Annual production costs went from \$64,000 to only \$4,000.



*"Datron's workholding almost eliminates set-up time and lets us run batches of parts unattended so we can do other things. We finished what used to be a year's worth of parts in a couple of months, so I programmed other jobs to get the biggest bang for the buck — that's how easy and flexible their software is."* said Brenneisen. *"It's a great machine that's improved our Made in America product and dramatically increased our revenue."*

**TECH SPECS**

So far we've detailed the overall business benefit that Ross Custom Switches gained through the purchase of a DATRON M35™. But, for those who are more interested in the technique employed in this application, here are the feeds and speeds, tooling and other job parameters for you to consider.

**Date:** June 6, 2003

**Customer:** Ross Custom Switches

**Part:** Model Railroad Component

**Material:** Delrin

**Machine Used:** DATRON M35 High Speed Machining System

Features Utilized: 600W high frequency spindle, Automatic Tool Management System™ (tool changer/tool length sensor), Vacumate™ workholding and Z-Correction Probe™

**Software Used:** PrimCam

**Machining Details:**

Tool 1: 3mm single flute micro-grain carbide end mill at 30,000 rpm / 200 ipm feed rates

Tool 2: 6mm single flute micro-grain carbide end mill at 20,000 rpm / 150 ipm feed rates

Tool 3: 4 flute T-Slot micro-grain carbide end mill at 20,000 rpm at 150 ipm

Tool 4: 18 degree custom ground beveling tool at 20,000 rpm at 100 ipm

Tool 5: 1.2mm single flute micro-grain carbide end mill at 45,000 at 40 ipm

**Total Cycle Time:** 1 Part = 165 seconds or 100 Parts = 84 seconds ea.

**Application Summary:** The combination of the M35 high-speed machining center and Vacumate work-holding system offered substantial time and cost savings per part. The ability to configure multiple parts at one time and have the system machine without operator interfacing significantly reduced operational costs. The success of this combination resulted from the high frequency spindle reducing side loads which permitted the small surface area of the part to hold on the vacuum table. Set-up times were reduced by the large working volume of the Aluminator which provided the ability to fixture several different types of parts at one time and/or the use of an integrated removable pallet system. The integrated Z-Correction Probe measured the surface of the Delrin sheet and compensated for any surface variances. The Windows®-based operating system allowed for easy networking and integration with other Windows®-based programs. The compact, efficient system operated on single-phase 220V and offered substantial operating cost savings by reducing power consumption. For this application, the complete system offered a speed and flexibility.

