



SAN-TRON – A FAMILY OPERATION WITH TORNOS CONNECTIONS

Just off US Route 1 (the first interstate in the country) is San-tron, Inc., a successful manufacturer of RF connectors, turned components, and cable assemblies headquartered in Massachusetts. The family-owned company was started in a cellar by Kenneth Sanders after he completed duty as a Machinist's Mate on PT boats for the Navy in World War II then ran Brown & Sharpes for the screw machine department in a local General Electric plant. The company has seen its share of ups and downs over the years – much like the pattern of waves that run through the RF connectors and cable assemblies made at San-tron today.



Ken Sanders in the 40's; his passion for technology and strong work ethic are still intensely lived every day at San-tron.



Mike - Swiss Department Supervisor, Wayne - Vice President, Rich - Swiss Setup (left to right in front of the ST 26 machines).

Kenneth Sanders and his brother Fred first had hopes of “making it big” selling Indian motorcycles in Florida near one end of Route 1 as the first distributorship in that state. They built and raced motorcycles; so this was likely a dream career for them. But the motorcycles didn’t sell well; and it appeared that life had other plans for Kenneth further up the highway.

In a town named Ipswich, he built a global company beginning with loans he secured to buy a couple of starter machines. With his back against the wall, needing to support his big family of seven kids, he was able to make a go of it in his small shop, taking any jobs that came along... doing piece parts for the connector industry, soldering tips for an English company, and military parts for companies like Varian Associates. Wayne Sanders, current Vice President at San-tron and son of Kenneth, credits a strong work ethic to his father’s success.

Strong work ethic helps San-tron grow and ride the tides of business

Incredibly, they still have a lot of their customers from the early days in the 60’s. But the business has definitely changed. Wayne explains, *“The screw machine industry would swing back and forth between good times and bad times. While making parts for connector companies, my father started putting pieces together, taking a chance and hoping that when things got better he would sell his customers the whole assemblies. His customers were happy to have him do that. And I guess that’s how we started getting into connectors. He always said ‘You have to have a product. You need some sort of a product.’”*

Today, San-tron designs and manufactures RF connectors, adapters, and complete cable assemblies – in addition to doing some precision-turned component work for a variety of industries and applications.

Dossier

"My father didn't start with Swiss screw machines; but I remember him telling me in my early years when I was just a youngster that he could get this other work if he had Swiss machines. So he bought a few Petermann and later added a couple of Strohms back then."

Wayne joined his father along with other family members at San-tron after getting his degree from Northeastern University and following a lab job at MIT. (Today Wayne has a brother that's the COO and another that's the CEO, a sister that's HR, a brother that is an assembly supervisor, his wife, son and a couple of nephews in the company – so it's a large family operation making primarily families of parts).

"I started working in the secondary department at San-tron where we were doing slotting and milling. And my job as a mechanical engineer was to automate the secondary operations. Then we lost a couple of Swiss setup guys and I was brought over onto the Petermann line. I think I put about 10-12 years into that department. Along the way, we learned that Tornos made the best Swiss machine. So we eventually picked up seven or eight Tornos MS 7's to do precision parts including cross-drilling and some secondaries. We saw how nice we could do the secondary operations on the Swiss machines. That was a big plus. We became very good in secondaries and also built a number of machines specifically for connectors. So when the communication boom hit, we were ready."

The connector business grew like crazy in the late 90's with the dotcom surge; and San-tron was so busy that at their height, they had 100 people working for them. The company expanded their rented

space, bought the 7,000 square foot building, and then moved operations into a new 30,000 square foot building in 1995. That year they bought their first Citizen CNC... a year later, another; then two Star SA Swiss machines along with Imoberdorf Rotary transfer machines for secondaries. Around 1998, they bought their first Tornos Deco 10. *"We had belief in Tornos... the quality was always there from the early MS-7's. Those were Cadillacs."*

With the Deco 10 they found they were able to run lights out. Says Sanders, *"We were doing lights out back around 1998. And our production went through the roof!"* The Tornos Deco 10 machine was so successful that they bought two more shortly thereafter and produced center contacts for connectors round the clock, kicking out complete parts on average every 15-20 seconds. Today, Deco 10's still make about 90% of all San-tron's center contacts.

According to Wayne, *"The Deco 10s were and still are very effective on center contacts for connectors... probably THE perfect machine. I believe the best machines in the world for slotting, crimping, back-drilling, and creating small threads on center contacts. The two opposing slides are beautiful. If you're*



Deco 10 sawing a connector contact.



Swiss ST 26 making a connector body.



Ease of access to tooling area of the Swiss ST 26.



Jack, R&D Supervisor; Tom, Assembly Supervisor (left to right).

doing small diameter and you're knurling it; you can bring a knurl in from each side. It's a tremendous way of knurling. Splitting the work between the main spindle and subspindle reduces cycle time dramatically. A lot of our center contacts are crimp-type contacts where the slots are crimped or reamed – these used to be 6, 8, 10 operations for our shop. With the Deco 10, it's kicked right down to one operation. When it drops into that container, the only thing we have to do is wash it and then get it into a heat-treat oven. We're done. The more times you handle the part, the more chance of something going wrong.

"The Deco 10 also gave us a lot more tools to finish the part. I think that's what we all want to do in the screw machine industry, is drop a part complete. The Deco 10's did that for us."

Ups and downs – Just part of Life

But when the dotcom bubble burst in 2000, San-tron had to rethink their game.

For the first time, San-tron began marketing and added a sales force (which they hadn't needed prior to the dotcom crash since word-of-mouth kept them so busy). They also applied for and received ISO certification. They had to spend money on things they hadn't had to spend money on before.

"As things kind of collapsed around the world with the overestimated dotcom bubble, customers basically advised us to go to China because that was where the big build out was in the RF field."

They followed their customers' advice and became a global company, opening a facility in China, and hiring employees to assemble the San-tron US-designed connectors for the growing Chinese market.

"Right after the dotcoms crashed, we were quoting hard and tight and trying to get work here in the US so we didn't have to lose any of our talented employees. We were hit pretty hard. Nothing was happening here in the states. It was slow. And our big customers, global companies who were participating in the Chinese cellular industry build out were saying to us: 'Your prices are good. We know your quality is good. But we can't give you the order because you're not here.' So we had to support our customers there."

"For a manufacturing guy like me it was very hard to go to China... very hard. Because I want to keep every bit of manufacturing I can in the states. But the work ethic in China was good, labor costs were low. And we needed to be there. It's a global world today and we realize that some of the parts come from overseas and some go out."

To keep as many jobs in the US as possible, San-tron invested in automation for their Massachusetts facility as well. *"We built some connector assem-*



Mike - Swiss Department Supervisor, Joel - Swiss Setup, Rich - Swiss Setup (left to right in front of Deco 10 machines).



Wayne and Mike in front of the Deco 26 with "the old cams of the past" in background.

by machines; one that does 40 different computer checks for quality. It assembles our standard "Type N" connector in about 4 seconds. It takes all the different parts from bowl feeders and orients the parts the right direction, assembles and numbers the parts. You have to automate. That's the big thing. It's good growth for us and keeps things stable. It was difficult being hit with the low costs of the Asian labor, but it forced us to improve our internal processes to compete and succeed in the global marketplace. We have a good engineering staff, good machinists and a family of great employees and we knew we could make the assemblies with good quality. The assembly machines and our automated turning machines keep jobs here."

Wayne points out that after the dotcom crash, they had a "bit of a problem on the manufacturing side" because they hadn't yet moved to CNC for parts over 1/2" diameter.

"It was rough getting work here during that particular downturn. We picked up some Index ABC turret machines. We went used because that was the most



Wayne in the front lobby of San-tron.



Assembly department at San-tron.

we could invest at that time to expand our capabilities. We took our CNC capabilities from about a 1/2 inch capacity up to 2-1/2" which is what we have today. That put us into a different realm of connectors. We were able to grab the 7/16 connector business. And we also moved down to the SMAs and smaller connectors."

Around 2004, San-tron purchased a Tornos Deco 26 machine. *"The Deco 26 has been a great machine. It's got great overlap like the Deco 10. You can split operations 50/50. The cycles on connector bodies are some of the best in our facility."*

So, with things back on track – increased automation, greater machining capacities, assembly facilities at home and overseas, and a solid work force, San-tron began to thrive again.

Last year, they placed an order for three new Tornos Swiss ST 26 machines. They needed more capacity for center contacts and smaller connector bodies between 1/2" and 1". The Swiss ST 26 fit the bill.

With San-tron's experience in China, they were open to the idea of a Swiss type machine partially made there. Wayne says they asked Tornos many questions. And when they learned that the machine was engineered in Switzerland and key components like the spindles were Swiss, they were interested.

San-tron's experience with Tornos over the years was certainly positive. *"Tornos has a great crew in Connecticut. We're in Massachusetts, so Connecticut is who we work with most of the time. Roland Schutz is always there with the answers to our problems. Mike Callahan, Paul Cassella, and Jim Kucharski do a great job."* Knowing the Swiss ST would be backed by this same team, San-tron placed their order for three Swiss ST 26 machines. And things are going very well so far.

Adding the Swiss ST to the San-tron family

"This ST 26 has a very nice polygon unit. And it has a lot of tool capacity: 36 tools. I think Tornos has a winner there! We reviewed our first 5 jobs that came off

the ST 26. We are averaging 17% faster on our cycle times over our turret machines already. We've got cycles of 60 seconds to 90 seconds and that includes threading and polygon milling, back threading, slotting and recessed bores. We do so much brass that polygoning is something we would always want on a machine now... after seeing it and using it on the Deco 26, Index, and ST 26.

"The ST 26 also has the Fanuc control which we like here. It's user-friendly and popular in the states so that makes it easier to add new people to the company. We also think it's a very stable control. We've never lost any of them in a power outage." And for San-tron, because they are on the end of the electrical service in Ipswich and get power glitches (outages and single phasing) quite often, that was important. They have noticed that their Fanuc machines will shut down properly; where some of their other controls have major problems.

San-tron is averaging about 5 million parts a year – primarily families of parts, these days. But they do some prototypes and short runs too. Average lot sizes are 500-2,000 pieces (with production level runs of 10,000 - 50,000 pieces); so quick setups are important to their operation.

"With the ST 26, we can edit at the machine. For short runs, where we're just trying to prove out a job – get it on and off without worrying about the cycle so much – the ST is quicker to setup. It will ask you what diameter you're doing, and then you press 1/2" or whatever and then you bring your tool right up to it and you're touching it off. If you want to change a speed or feed it's a little tougher on other machines because you have to go back to your computer, make the change and load it back on the machine. We don't have to do that with the ST 26.

"I like the double slide setup on the ST 26 – that was really a great selling feature. It's great for knurling from both sides or being able to overlap the work just like we do on the Deco 10s and the Deco 26. The slides are quicker than our turrets. It's much quicker to move a slide back and forth than it is to bring a

turret in, do your cut, bring it back, index it, bring the turret back in. The fact that Tornos is bringing more tools on the machine and using the slides on the machine, it's a good plan to give you better cycle times. When I was a kid, Swiss machines were very limited. There was no revolving guide bushing, there was no front and back-end work. Usually your turret machines could beat the Swiss machines cold. Unless you had a long and narrow part – the Swiss were the only ones that could do those accurately.

"We would just love to see a 32 mm version of the ST. If they do it pretty quick, we'll place orders. We have some other machines that we're going to be phasing out. And I'd like to work in the direction of adding more Swiss style machines because they're fast and accurate. It looks like Tornos has a deep hole drilling feature on the ST too. There's a family of longer deep hole parts we're hoping to swing into the ST.

"Another thing I like about the ST is the removable bushing because it can help us cut down on some of the waste of more expensive materials – bronzes and beryllium coppers and stainless – sometimes we may not want to waste 8 or 10% of our material. It can also save us from having to grind. I've seen it happen that we get material in after we have quoted a job and the material is not round enough. If we haven't allowed enough money in the job for grinding, we can remove the bushing assembly on the ST. We don't want to forget that feature is on the machine. I think it will come in handy soon and bail us out. I can't wait to try it.

"We brought one ST 26 machine in and we placed an order for three based on the fact that it would keep efficiencies up. We got through the learning curve on the first one and we just brought the second one in and it went up real quick.



The center contacts for these small eSeries connectors are made on San-tron's Deco 10s.



SMA 2.92 connectors.

"I'll tell you, we had taken another machine and moved it across the aisle, and within a couple of days we actually had the Tornos ST 26 up and going. We were probably another week to get the machine we moved back up."

San-tron in a secure position for whatever comes their way

San-tron manufactures a full catalog of RF connectors and has seen growth in security technologies in the post 9/11 era. As the telecom carriers and technologies have changed, San-tron has remained ahead of the market requirements. They recently received AS 9100C certification for aerospace (to support the ITAR, ROHS, and DFARS compliance they already had in place); so beyond commercial communications, the company plans to continue expanding their aerospace & military production which has been part of their product mix since the beginning.

Recently San-tron achieved the great honor of having their SRX low-PIM cable assemblies installed in the 104-story Freedom Tower skyscraper that occupies the former location of the 6 World Trade Center in New York. The cable assemblies will be used for the building's wireless communications and security equipment. On May 10, 2013, the final component of the skyscraper's spire was installed, making it the tallest building in the Western hemisphere and the fourth tallest skyscraper in the world. So, for San-tron, it appears that they are back on top.

In December 2013, Wayne and his family sold the original 7,000 square foot building that San-tron had occupied from 1963 to 1995. It brought back old memories when they moved the equipment out of there and could see stains on the floor where the Petermanns had been located. When his father transitioned the business out of his cellar and into that building, he rented a mere 10% of that space. Now, they're a global manufacturer with a very bright future.

If you've got a good work ethic and you're looking to become a Swiss turn operator or programmer in the Massachusetts area, watch for the "Help Wanted" signs along old Route 1. San-tron is growing; and they've got great machines.



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