



Tim Spencer's TRUE Systems, based in Tucson, Arizona, has been quietly building a reputation as a manufacturer of quality mic preamps for the last 12 years. Tim's electrical engineering degree, and years of work for Burr-Brown and Hughes Missile Systems and a passion for recording combined to make his own version of a microphone preamp, with more products on the way.

### What made you turn to audio manufacturing?

I always maintained a home studio. When it was reported that Raytheon was looking to buy Hughes, I woke up one morning and said, "All I do is manage political stuff. I would love to do something creative and something involving my loves from the past." I thought about going back to school, but over a nine-month period, recording came to the forefront. At one point I decided I wanted to work on a project that would make my life a little easier. The first thing I thought I needed was a good multi-channel mic preamp. This is about the time when the Alesis ADAT and Tascam DA-88 MDM decks were popular.

### Each of those are 8-channel boxes, but they have no preamps.

Well, if you had some good preamps and some decent mics, you could go out for location things and do good recordings of grand piano, choirs or live shows - you could make your studio wherever the talent was. I don't know if I was necessarily thinking of going to market or anything like that. I just wanted to do some good recordings.

### Did you want to open a studio?

Not at that point. I just wanted to be able to go out and make some cool recordings. I pulled out my 20-year-old Fluke digital multimeter and my \$400 Korean oscilloscope and put them on the kitchen table. I started researching the favorite analog components of the day. I wanted to see what op-amps, topologies and transistors were popular. I was thinking that surely life had changed a tremendous amount in the 20 years while I was in industry. Things had not changed tremendously. I started designing different circuit topologies. I actually started with five different topologies. I put them in a little brown prefabricated metal rack mount - so they couldn't be seen by the outside world. I wanted

to see how my pro audio and musician friends reacted to them. I would go over to one studio or another studio and plug in my test unit and we would compare how things sounded.

### These were blind tests.

My little brown box was ridiculously ugly - they would pull out one of those expensively constructed units, like a Focusrite Red, and it was embarrassing. This would have been around 1995 or 1996. We started to do A/B comparisons. Some of the topologies were good, but not astounding. We landed on one that was a favorite, so I decided that I was going to focus on that topology. During that time I explored different components, brands and parts. We exchanged different parts that are supposed to be electronically similar, and found that they were not when it came time to listen to the preamp. We spent months doing this. When we started this I used very basic test equipment for things like noise and bandwidth. After that point you have to go deeper - you have to listen and you have to examine other things. From an audio standpoint some of these measurements can be too global or too broad.

### Can you give an example?

Well, there's the THD + N specification, which stands for Total Harmonic Distortion plus Noise. That's nice, but it's a big glob of information. Within that you have different components of harmonic distortion. Some amplifiers have harmonic distortion that they are known for and a type that creates a pleasing sound. For our purposes, examining THD is a waste of time. Our work was not designed to make the preamp with the lowest total harmonic distortion. There are engineering things you could do, if you wanted to do that.

### You wouldn't have to listen to it.

You wouldn't ever have to listen to it. In fact, you could build it on a simulator and never listen to it. That kind of approach has values, for example, in industrial applications or industrial automation. But in my experience it doesn't work in pro audio. Our ears are much too sensitive to more kinds of errors than the typical measurements show us. I don't really subscribe to the idea that there is just "one" thing that you optimize to make a great piece of audio gear. Some of it is analysis, some of it is engineering intuition, and some of it is serendipity.

### At what point did you say, "The Precision 8 is ready"?

It was kind of a reverse order when compared to some other product introductions. The idea was to build a one-rack unit, 8-channel mic preamp. There's an old saying, "The only way to finish the project is to shoot the engineers." Drawing from my industry experience I always knew I would have to cut it off. There was a point in the tests that we decided that in our minds, we were either on par or superior to the benchmark preamps we tested against. Of course this is always subjective, but we were satisfied with the sonics. There is always the factor of the bank account. Because by now I had not been employed for almost a year. We made a plan of how to put it all together and bring it to market.

### What was the next step?

Since we knew what the circuit needed to be, we knew the size requirements for the enclosure. I went off to learn about metal work and enclosures and that whole thing, which was fun.

### It's it easy to spend a lot of money on the enclosure.

It can be. You could easily go over budget with extras and features. My past with Burr-Brown was valuable in teaching me how to design to a cost. That's not to say that I tried the cheapest route. I tried to design from the front panel back - I wanted to create a good user interface. But of course for us, the sonic performance was always the number one priority.

### Where did the name TRUE Systems come from?

It was a conscious effort to make a distinction since it's a new name and a new product. We wanted to tell potential customers what the point of this particular preamp is. After going through numerous possibilities, we boiled it down to wanting a name that reflected something that was straight ahead, solid and good sounding. We kept coming back to TRUE Systems as a name that fit these qualities.

### I've heard the term "straight wire with gain" in reference to your designs.

I hate using pristine or "straight wire with gain" to describe audio gear. There is still a character - I don't care how clean it is. You can tell the difference among the preamps. I would say that our products are designed to be transparent but musical. One preamp might be marketed as "pristine" and sounds light and airy in a five-minute demo in an audio store - but when you get 24 tracks of it for a full recording, it might be shredding your head to listen to it.

### Were you trying to suck every bit of information out of the mic? Well, I kind of thought of it as not screwing up the information that the mic was giving the preamp.

### What things did you do to get this sound?

I kind of came from the perspective of "overbuild everything". That was the intent. That's why we have the +/- 24 supply volts running through the unit, so it has extreme headroom. The input devices and circuit topology were selected for low noise. The balanced circuit topology also cancels internal distortions and is far more immune to pollution from power supply issues to outboard common mode

noise. At the same time we didn't just arbitrarily double everything. Once we had the prototype built and sounding where we wanted it, we did a pass to review if there was a tighter, more economic way to manufacture it. If we found one, we implemented it. But if a new way gave less sonic performance in any way, we kept the initial design. I guess the word "optimize" does come up. The idea was, could we find any efficiencies or ways to be smarter in how we manufacture this?

**Pro audio manufacturers aren't buying components in big enough quantities to get big discounts.**

Right. People may not realize that we simply can't buy in the quantities that other industries use. While it would be great to sell a massive number of preamps, the fact is even if we did, we wouldn't be able to make them significantly cheaper than we do right now. I've been fortunate that we've made deals with component manufacturers who are ethical and honor their deals.

**How did the mid/side function develop?**

Based on the circuit topology we were using, it would have been an easy feature to add without harming the sound of the unit or adding significant cost to the manufacturing process. At that time few people talked about mid/side, but now years later more people are familiar with the technique and they are happy that it's there. When we moved to the P2analog, we added the stereo phase correlation display to give a feature that is useful for the user. For example, if you use the DI of one channel and you use a mic on the same instrument in channel two, having the phase meter is very helpful for determining mic placement.

**Speaking of new features, the new P-Solo units are one-channel units. Are they watered down versions of the bigger units?**

Not in any way. Any variations in our product are slight changes from the layout of the circuit board to accommodate the form factor of the enclosure. The only sonic changes might be subtle changes in midrange detail. Since our products are already designed to bring a lot of detail, it shouldn't be any kind of problem for the end users. We added a linear power supply instead of a switching or a wall wart supply.

**There is also a ribbon preamp - the P-Solo Ribbon.**

In 2006 we were across the aisle from the Crowley and Tripp booth at the TapeOpCon. We spoke with them about doing some work with their products. Awareness of ribbon mics has increased in recent years, with more media coverage of them as well as more offerings hitting the market. One of the questions people have when thinking about a ribbon mic is, "Do I have a mic preamp that has enough gain to support my ribbon?" Or, "How do I match my ribbon with the correct impedance?"

**What are the main differences with this unit?**

The first difference is in the gain structure. We increased the basic gain range. In the P-Solo, the range is 15 to 64 dB, but for the P-Solo Ribbon we increased it to 15 to 70 dB. There is also a high-gain switch that shifts the whole gain range up by 6 dB. In effect, the range would be 21 to 76 db if you needed that kind of structure. Another thing is the input impedance. We took away the phantom power circuitry and we increased the input impedance. Through discussions with some ribbon mic manufacturers, we learned that the dimensions of the ribbon and some other factors result in resonant frequencies, which cause the output impedance of the mic to peak at those resonant frequencies. If you don't have a high enough impedance on your ribbon mic preamp, you can get sonic variations. A combination of fluctuating ribbon output and too low of an impedance on the mic pre will cause variations in sonic character. Since we were already a balanced servo design, we were able to remove all capacitors from the signal chain and increase the impedance of the unit.

**What's up next for TRUE Systems?**

We're unveiling our new P501 500 series mic pre, which uses a new circuit design that will offer new options to 500 series owners that want a higher performance preamp. We've wanted to do this for a while, but couldn't do it before because our original design required 24-volt power supply rails. But with our new design we can provide superior performance with the standard 16 volt power supplies found in the API-style 500 series racks. Also coming is the P-Solo D/R, a new dynamic and ribbon mic pre for dynamic mics, especially old school dynamics - mics that require a different input impedance and gain structure. You won't believe what a Shure SM57 or SM7 sounds like through this preamp! We're also working on some new multi-channel models that will have focused features for specific applications, such as live sound, remote broadcast, media production, location recording and front-end features for the most popular DAW platforms used in studio recording. ☺

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