



# True Systems Precision 8 mic preamp

BY MONTE MCGUIRE



## Eight channels of mic preamps in one rack space—great sound and unexpected extras

Many of us record digitally these days, and a typical difficulty we encounter is how to get warmth and depth into our recordings. According to popular opinion one needs tube devices to achieve this, and many preamps and channel strips now offer varying amounts and types of tube coloration.

The problem with this approach is often that the extra tube coloration is just that, merely extra grit and dirt thrown onto a low-resolution preamp. Sometimes, especially with the low-end hybrid preamps (i.e. those combining solid-state and tube technology), this only makes things worse.

There is another approach to achieving a big-sounding recording, however, and that is the high-resolution, low-coloration approach, embodied by the unit under review.

The True Systems Precision 8 is an extremely clean but very rich and detailed sounding preamp. It doesn't add any coloration, detail or presence to your signal, and it doesn't strip away the depth that's already coming from your microphones.

If you're inclined to think that 'clean sound' means sterile and cold sound, one listen to this preamp will convince you that clean does not have to mean boring or flat-sounding.

### Mic inputs with DI?!

The unusually versatile I/O configuration of the Precision 8 makes it a good fit for many modern recording situations. It offers eight channels of mic preamp in a single rack space package. Let's begin the inspection around back where all signals connect.



Green LEDs show signal presence and +4 dBu signal. Amber LEDs show -6 dB and -3 dB, red LED shows 0 dB; the amber and red lights are relative to a switch-selectable peak reference level to indicate available headroom.

There are the expected eight XLR mic connectors, plus two unexpected but welcome extras: two active, high-impedance instrument DI (Direct Inject) inputs, and user-selectable M-S (mid-side) decoding capability. Let's look first at that DI bonus.

The discrete FET DI circuit feature is implemented with Neutrik Combo connectors on channels 7 & 8. The XLR portion of the Neutrik sockets of channels 7 & 8 accepts the

mic signal. When a 1/4" cable is plugged into these Combo sockets, a small relay is activated to switch the DI circuit into the signal path. This is a wise design approach, since the switching contacts inside a connector can become unreliable over time, yielding a poor audio connection. It's much better to have a relay.

It would be more convenient if the DI inputs were located on the front panel, for quick and unobstructed connection of instruments when needed. But as we'll see in a moment, there really isn't any room left in front for such a feature.

### Inputs with M-S decoding

The other fancy feature of the Precision 8 is a switchable M-S (mid-side) decoder, offered on channels 1 and 2. M-S is a stereo miking technique that uses two different types of mics in the following manner: One is a cardioid or omni mic that faces forward, toward center stage or straight at the sound source, for the 'M' channel; the other, functioning as the 'S' mic, is a figure-eight mic positioned sideways so that its null faces center stage or the sound source.

The 'M' mic provides the mono portion of the signal and the 'S' mic provides the left-right directional information. Raising the level of the 'M' mic raises the identical "forward" mono signal across both channels.



By adding in varying amounts of the 'S' mic you can control the width of the recording without having to physically move the mics. See my 'Live Recording—Capturing The Band And The Audience' article from last issue for a photo and more detailed description of this setup.



The Peak Reference Selector sets the headroom indicated by the amber and red LEDs; when triggered, the red peak LEDs (PK) and the channel overload LEDs (OL) stay on until the Reset button is used.

Traditionally, when people record with M-S, they simply print the M and S channels and decode them later. The problem is monitoring the M-S encoded signal in the field, and it's handy to have an M-S decoder like the one in the Precision 8 to see how the mic placement works. It allows you to decode the M-S matrix on the spot, so that you can print the decoded signal directly to a stereo recorder, or to monitor the mic placement without requiring extra gear or complicated patching.

#### Outputs and remaining rear-panel features

The outputs are all balanced, duplicated on both an 8-channel DB25 and on eight individual TRS 1/4" connectors. Both types may be used simultaneously, a nice design touch that increases the possible uses of the Precision 8, for things like feeding two recorders at once or creating a separate monitor mix.

All outputs (and all inputs) are on the rear panel. The Precision 8 fits well into a rack with an MDM or an outboard converter that also has rear connectors, letting you use really short connecting cords. A 3-prong IEC socket for the detachable AC cord and a power on/off switch complete the rear panel.

#### Front panel metering

The attractive front panel has absolutely no unused space, yet it manages to remain uncluttered despite the generous number of features. A good bit of real estate is given to a fairly extensive metering system which incorporates a clever signal level and headroom indicator.

At the bottom of the bargraph next to each channel's gain knob are two green LEDs, the lowest to indicate signal presence, the next-higher to show a +4 dBu signal. The next two LEDs are amber and the top LED is red, and they are calibrated to show headroom in dB relative to a switch-selectable peak reference level.

#### Finishing the headroom

The idea is that you set the (global) Peak Reference Selector on the far right to the headroom of your MDM or converter, so that you have a clear indication of how to set the levels and whether you're overloading the converters. The first amber LED fires at 6 dB below the preset level, the second at 3 dB below the preset level, and the final red peak LED (labelled PK) fires when the signal has reached the preset peak reference level.

Some MDMs are really bad at indicating overs, and if you are unlucky enough to have one of those, the Precision 8 metering system will prove to be very useful. For example, if your converters are calibrated for full scale with a +20 dBu input, you can set that level on the Peak Reference Selector, adjust the input gain so the first amber light rarely lights, and you'll quickly and easily get a gain setting that's very close to ideal. If you set the gain too high and the output exceeds the level you had set, the red LED stays lit to warn you of the incident until you press the reset button.

#### Overload indicators

In addition to the programmable headroom indicators, a preamp overload indicator is provided—the red LED marked OL to the left of each channel's bar graph. Once triggered, it stays on until it is reset by the same button that resets the programmable peak indicator.

The channel I tested triggered the OL LED at an output level of +25.8 dBu, about 2 dB below clipping. The specified clip level is +31 dBu, but I measured a level of +27.7 dBu, and that's a bit of a discrepancy. If the manufacturer's clipping spec was a peak measurement, then this would explain the discrepancy, since my measurement was an RMS measurement and, when converted, the two

are practically the same value. However, what's more confusing is that the headroom indicators are calibrated in RMS levels.

#### Peak and RMS values

Fortunately, there's a simple way to convert between peak and RMS values. A sine wave will have a peak value that's 3 dB larger than its RMS value, so for an example, a sine wave whose peak level is at +31 dBu will have an RMS level of +28 dBu.

A converter calibrated for a sensitivity of +21 dBu = 0 dBFS on a peak basis will produce full scale with a +18 dBu sine wave. Once you figure out how your MDM or converter is calibrated and choose a setting that is close to the converter's clip point, it's very easy to use the headroom indicators on the Precision 8.

#### By ear

You can easily skip all this math and adjust the meters by ear if you like. Shure makes a little battery-powered slate oscillator in an XLR barrel that's ideal for this purpose. Connect the Precision 8 to your converter, plug the slate oscillator into a preamp input and monitor the output of your converter. Turn up the preamp gain until the converter just starts to sound distorted.

Alternately press the peak reset button and adjust the sensitivity switch so that you select the most clockwise switch position that makes all of the bargraph LEDs light. You'll be off by no more than a dB or two, and any error will be on the safe side.



Channel 7 & 8 Neutrik combo connectors double as mic (XLR) and instrument DI (1/4") inputs. When a 1/4" plug is inserted, a small relay is activated to switch the active DI circuit into the signal path.

While we're on the subject of preamp overload—the Precision 8 has an unusually high overload point, especially for a preamp that employs integrated circuits as well as discrete transistors. This was made possible by the use of the Burr Brown OPA604 and OPA2604, two excellent sounding op amps that are unique in

that they can handle the unusually high 24 V power supplies that the Precision 8 employs internally.

### Channel gain controls

The gain controls on the Precision 8 are continuously variable and they feel quite nice. Experts disagree as to whether stepped gain controls or variable gain controls are better, and it's our opinion that this is largely a matter of choice.



The On button turns channels 1 & 2 into M-S (mid-side) decoders: Ch. 1 now controls the level of the mono 'M' signal across both left (output 1) and right (output 2), ch. 2 (the 'S' signal) now adjusts stereo image width.

Stepped gain controls let you set and reset the preamp very repeatably, but they lock you into a small number of gain steps, none of which may be just right. Continuous controls can be easily and discreetly adjusted while you're recording, a handy feature in a workstation environment where there's no fader on the way to the converter.

The only technical drawback of continuous controls is that they can be electrically noisier than a switched gain network. When I had the Precision 8 on the bench, while measuring distortion, I noticed a few times that the gain pot created a little excess noise in some positions. This was relatively minor and won't be easily noticed in practice, but it does separate the Precision 8 from its much more expensive competition.

Stepped gain controls with a large number of evenly spaced gain steps can be outrageously expensive, so it's a tradeoff. Incorporating such a feature could have easily doubled the cost of the Precision 8 with only a tiny sonic benefit, so I can understand the approach the manufacturer took.

### Phantom and polarity

The final two features of the Precision 8 are the usual phantom power switch and the polarity switch,

both conveniently located on the front panel (where they should be). My only criticism of the way the phantom power switch is implemented is that it is very difficult to see whether phantom power is on or off without walking over to the preamp for a close look.

The problem here is that if one connects or disconnects a mic or cable when phantom power is on, this action can generate a very large and potentially damaging transient at the input of the mic amp, one that could degrade or destroy the input stage. While the Precision 8 has what appears to be a pretty robust input protection scheme (using a hefty diode bridge and a pair of Zener diode voltage clamps), the shipping carton displays a brightly colored warning advising against patching a mic when phantom power is on. Something to remember, and a practice I try to adhere to with high quality mics and preamps anyway.

### What is it for?

So what is this preamp good for? Nearly anything that you want to capture accurately. I tested it on a variety of sources, from voice to acoustic guitar, bass and percussion, and every time the Precision 8 sounded clear and detailed but not harsh or sterile. The overall tonal balance seemed very accurate, with a full and solid low end and a slightly bright but not harsh high end.

### With microphones

Because it uses a transformerless instrumentation amplifier circuit, the Precision 8 loads a microphone quite lightly and uniformly over the frequency range. This means that mics through the Precision 8 sound the way we'd expect them to sound, except that you'll hear a little extra clarity and a more solid low end than what you may be used to from lesser quality preamps. The high end response is also quite good, perhaps even a little emphasized, but not drastically, and never in a way that sounded harsh or out of balance.

Contrary to popular opinion, many of the classic ribbon mics were designed to be lightly loaded, and the 5K ohm input impedance of the Precision 8 allows such a mic to perform with the high- and low-end response that it should have. As an example, the RCA BK-11 sounded very rich and full on my voice, much

more so than with other transformerless preamps, but not at the expense of midrange clarity.

### Comparisons

My modified Symetrix SX202, another transformerless preamp, sounded a bit more cloudy in the midrange when compared to the Precision 8, and the low end was quite a bit less solid. I attribute the solid low end in the Precision 8 to the fact that it uses only one coupling capacitor at the input to block phantom power, and a dual servo circuit to remove DC offsets, rather than numerous inter-stage capacitors that can degrade the low end if they are not carefully chosen.

The frequency response of the Precision 8 is quite extended and flat, in keeping with the low coloration philosophy, and this too may be part of the reason why it sounds so open and neutral.

Even though the Precision 8 does not have elaborate RF protection on its inputs, it behaved very well in my fairly typical but noisy urban environment, and I would not expect any such problems from the unit. By contrast, an experimental transformerless preamp I have here had a few problems with RF on one channel, whereas the Precision 8 in the same setting was completely immune.



Both types of balanced outputs—the 8-channel DB25 connector and 8 TRS jacks—may be used simultaneously.

### On the test bench

The Precision 8 proved to be a really clean amplifier. Traditional THD (total harmonic distortion) plus noise measurements are largely limited by the noise floor of the preamp, and the unit easily met its distortion spec of 0.0008%. I used an FFT (Fast Fourier Transform, a computer tool that displays a signal's overtone structure) with these results: At 40 dB of gain with a -20 dBu 3 kHz input, the actual distortion was 0.0002% of second harmonic, 0.0003% of third harmonic and only the tiniest amount of fifth harmonic.

Distortion rises slightly at higher frequencies, but it does so very gradually. This effect might be why the high end of the Precision 8 sounds a little bright, if euphonic, but again, specs are not always so easily correlated with sound quality and I could be wrong!



The Precision 8 will drive 600 ohm loads, but not as cleanly as it can drive a higher impedance load, especially at high frequencies. Fortunately, very few devices today actually present 600 ohm loads to a mic amp, so this very slight shortcoming won't amount to much of an issue in the real world.

The noise performance was also quite commendable. Because it is a variable gain preamp, the output noise increases with gain from a minimum of -85 dBu at minimum gain up to a level of -65 dBu at maximum gain. The specified equivalent input noise spec of -132 dBu was easily met, and this is common for a top-quality solid state preamp.

#### Summary

The Precision 8 is a very clean but big-sounding preamp, one that is certainly in league with the best transformerless preamps out there. The advantage it has over competitive preamps is that it is extremely compact, and relatively inexpensive on a per-channel basis. This makes it a simple choice for anyone who wants an improvement over built-in console preamps or less expensive outboard preamps.

Every mic I tried sounded great on the Precision 8 and there were few surprises. It seems to bring out as much detail and clarity as possible from a mic while adding only minimal but pleasant coloration. It would be the perfect mate for a high-resolution converter.

I found it to be very simple to use and relatively foolproof. While the novel metering system might be a little confusing to set up initially, once it's calibrated it makes it really fast and easy to set the preamp gain optimally for a digital recording situation.

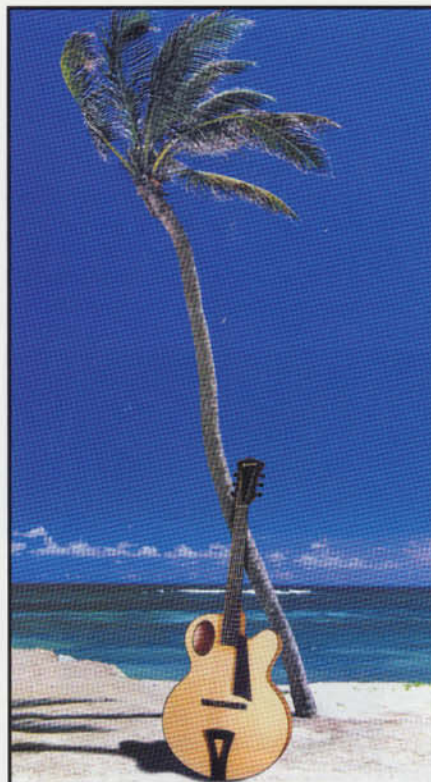
I could certainly make some great recordings with the Precision 8 if this were the only preamp available to me. I highly recommend it to anyone who wants a high-end preamp on a mid-price budget.

**Price:** \$2850

**More from:** True Systems, dist. by Neumann USA, One Enterprise Drive, Old Lyme, CT 06371. 860/434-9190. [www.neumannusa.com](http://www.neumannusa.com).

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