

## RE Designs SCPA-1 Six-Channel Preamp

by Glen O'Hara

The SCPA-1 six-channel preamplifier is designed as an in-place calibration and volume control for 5.1 systems. R.E. Designs has taken the purist approach: no VCAs.

### Features

Six individual 10-turn adjustment potentiometers are provided for channel trims — accurate to 0.025 dB! I haven't used multiturn potentiometers since my days in the Navy with very expensive military gear. These individual trims also include a clever locking device. Once the 5.1 calibration is set, one has to consciously intend to change it by unlocking the levers. This setup allows wide differences (up to 12 dB) between channels in your 5.1 playback system to be level calibrated perfectly, whether the levels were off due to cabling, amplifiers, different drivers, etc.

The large knob on the front panel is a 24-position, precision-resistor stepped attenuator, with make-before-break contacts. All six channels track from 0 dB (unity to +18 dB gain) down to -46 dB maintaining less than 0.1 dB tracking mismatch among all channels at any position. The stepped attenuator does this in 2 to 3 dB increments.

The heart of the SCPA-1 is the Burr-Brown OPA671 pure Class A op-amp. The literature supplied with the SCPA-1 goes into some detail on this choice vs. discrete components, posing the question as to why other manufacturers are not using more of this astounding operational amplifier.

The only objection I could see would be the almost half-a-watt heat at idle, generated



by the Class A biasing. This would take some considera-

tion if quite a number of these needed to be packed into a small space.

The only other consideration might be the price. The op-amp is an expensive device, and the SCPA-1 uses 12 of them; 24 for the SCPA-2 (upcoming balanced I/O model to be released in Summer 2002). List price for the SCPA-1 is \$2,700; SCPA-2 to be announced. Manufacturer's specs are 20 Hz to 20 kHz <0.1 dB, with THD + noise in the -100 dBV range. Output impedance is 100 ohms.

The SCPA-1 is unbalanced and uses gold-plated RCA jacks that are ground-isolated from the chassis. Before you discount this unbalanced version for pro use, know that the balanced model SCPA-2 requires five extra components per channel to achieve transformerless balanced connections. The SCPA-2, available mid-2002, is balanced in and out and uses Neutrik XLR connectors.

### In use

Setting up the SCPA-1 is a snap. All you need is a pink noise source and an SPL meter (even the good old Radio Shack meter will

work fine), although I used an RTA with a calibrated microphone.

The multiturn channel trims are very sexy, but also quite practical. The locking levers are not only a nice touch, but prevent inadvertent movement from the calibrated settings. Start by turning all the individual calibration trims fully counterclockwise (minimum).

Determine which of your five channels is the loudest on the SPL meter. Leave this one

### At a Glance

#### Applications:

Surround monitoring for studios, post production, theater systems

#### Key Features:

Six-channel preamp; high-end Burr-Brown Class A op-amps; gold-plated RCA connectors; fine volume adjustment

#### Price:

\$2,700

#### Contact:

RE Designs at 781-592-7862

at the minimum setting; then trim the other four to match. If the subwoofer level is too hot when using the center channel reference, leave the subchannel trim at minimum and bring up the five other channels, starting with center channel reference at 10 dB below the subwoofer.

If the subwoofer has an additional input level control already in use, I would use it instead and leave its level at minimum on the SCPA-1.

Once calibrated, feed the SCPA-1 with full levels from your console, or mixdown deck. The most amazing position of the SCPA-1 is the very first click from minus-infinity to 46 dB below unity. This was the cleanest low level I've ever heard in my own system. I previously used digital volume reduction on my console, which at low levels means less resolution, less linearity and more quantization noise from the converters.

Now, with the SCPA-1 in the circuit, the aux outputs are running at full digital resolution. That's why this very quiet position was so impressive. Clicking up the rest of the scale I found my system producing about 85 dB SPL on 5.1 music with the SCPA-1 near its -15 dB mark, or the seventh click down from zero. This put my playback system just about into clipping at the 0 position; obviously the settings for your system will depend on the sensitivity of your particular amps/monitors. The SCPA-1 is capable of 12 V peak output.

Before you discount the unbalanced SCPA-1, let me tell you that this is the purest version. Only two Burr-Brown OPA671s and an OPA130 DC servo at the input are in the signal path. The common mode rejection gained by using balanced cabling in our studios always requires compromises in the components feeding or being driven by the cables. This is why many of the highly

regarded amplification devices in professional applications (like Neve and John Hardy mic pres) use transformers at their input and/or output stages.

Because my console and powered monitors all use balanced connections, I made up some XLR to RCA cables using Audioquest Turquoise cable. I use this solid-conductor, oxygen-free cable for analog audio interconnections throughout our 5.1 mixing suite. Since the Audioquest Turquoise has two inner conductors plus shield with drain wire, I didn't connect the shield or drain wire at the RCA ends, but connected the shield and drain wire along with the white conductor to pins 1 and 3 at the XLR end.

At the other end, the white inner conductor was soldered to the ground case of the RCA. The black inner conductor was connected directly from pin 2 of the XLR to the hot pin of the RCA.

To accomplish a balanced design without transformers, while attempting to maintain the sonic purity of the SCPA-1, Dan Banquer, chief engineer and designer for RE Designs, had to add a pair of Burr-Brown OPA2134s driving an INA134 differential amp on the inputs, and two additional OPA671s to drive the outputs in balanced configuration: all times 6, for each of the channels of the SCPA-2.

### Summary

The SCPA-1 may be one of the quietest, most linear preamps on the market today, regardless the number of channels. My listening tests were reminiscent of John Hardy mic pres, various Manley components, Avalon or Summit preamps, etc. Burr-Brown calls the OPA671 a diFET design, using input FETs feeding bipolar devices.

The 100 V/microsecond slew rate, along with absolutely no square wave ringing, was

quite evident in my listening tests: exquisitely transparent. These op-amps can be configured with flat response to 1 MHz! The way these wide band devices are executed in the SCPA-1, however, RFI should be of no consequence. Much attention to detail on RF shielding was evident in the construction of the SCPA-1.

Banquer elucidated all considerations to accomplish the balanced configuration in the SCPA-2. One of the key specifications he was able to accomplish in the SCPA-2 was its more than 80 dB of common mode rejection as compared to the typical 50 to 55 dB of most balanced audio components. Once I got passed cringing about the unbalanced RCA connections, however, the sonic purity of the SCPA-1 was thoroughly enjoyed. By the way, the output of the SCPA-1, using the OPA671 op-amp will feed more than 100 feet of good cable without phase shift.

Those purists who still can appreciate differences like Neve Consoles that use Flying Faders instead of VCAs will love this unit for its 5.1 installations.

*Glen O'Hara, president of OCI Records, teaches digital audio and multichannel (5.1) mixing at the Conservatory of Recording Arts in Tempe, Ariz. and is a contributor to Pro Audio Review.*

**R.E. Designs**  
43 Maple Ave  
Swampscott, MA 01907-1722  
781-592-7862  
banquer@erols.com

**Units are available by direct mail from:**  
**Shamrock Audio**  
235 Coolidge St.  
Silverton, OR  
503-873-3755  
[www.shamrockaudio.com](http://www.shamrockaudio.com)