



Fig. 1: Pre-Synthesizer schematic

ages are present in your system, use audio grade capacitors at the inputs and outputs. Also, decouple power supply noise with .1 microfarad capacitors at the V in pins.

At this point you may notice a drawback to the Pre-Synthesizer. At the blend extremes there will be no left or right separation. Because any reasonable degree of enhancement occurs long before either extreme setting, it probably will not be objectionable.

Using the Pre-Synthesizer is easy. Treat it like any other line level processor and patch it between the pre-amp and power amp. "Purists" may tap off the supplementary two-channel outputs and use these for the front channels.

The circuit works as described on quad and stereo discs, and with virtually any decoder. However, best results are obtained with the more sophisticated designs. UHJ-encoded discs are the most interesting as the Pre-Synthesizer accentuates the X-signal information when Ambisonically-decoded. QS Vario-Matrix users may leave the decoder in the basic QS mode and use the Pre-Synthesizer to control Surround/Hall. Finally, if used in the two-channel recording chain, creative control can be exercised over the front-to-rear stage position.

Happy building!

Parts list: IC1 = LF353, or equivalent  
IC2 = TL084, or equivalent  
C = .04 microfarad, 20 WVDC+  
VR1 = 100,000 ohm dual-linear taper pot  
all fixed resistors = 100,000 ohm, except  
\* = 50,000 ohm  
\*\* = 300 ohm

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#### BUILDING A QUAD PANNING CIRCUIT -- Kenneth H. Parsons

A panning (panoramic) control is very useful for amateur and professional recording. With such a control, a source can be positioned in any channel or anywhere between (pair-wise blending). This technique is used extensively in stereo recording. Most often mixing consoles have panning controls for each input.

The circuit shown in Figure 2 can be adapted to different uses as described below. The schematic to the left of the dashed line is a stereo panning circuit adapted from a design in National Semiconductor's Audio Handbook. The output signal has a gain of unity at each extreme positioning of the pan pot. With the pot centered, the output is down 3 dB (half power from each speaker). U1c and U1d are used to invert the phase of the output signal so that it is in phase with the input.

**STEREO PANNING MIXER.** A stereo mixer can be built by duplicating the circuit in the dashed box. A four-input mixer would be quite useful for mixing quad tapes down to stereo. With this you can create your own unique mixes.

**QUAD PANNING.** To transform the stereo panning control to quad, all that is necessary is to add two more panning circuits. The pan pot for this should be a dual-ganged type so that left front-back and right front-back panning can be adjusted together. In operation, the input may be panned left-to-right by the first pot VR1 and front-to-back by the second pot VR2. Centering the controls will locate the