Small Stone
Fixing problems Notes
Revision: 2000/06/08

**GENERAL THOUGHTS:**

EH has never been know for quality choice of parts. There is likely to be wide variations in actual component values throughout their circuits, including the Small Stones. What this means is that there may be some sound differences from unit to unit, exact mods may not affect one Small Stone the way they do another. You may have to play around with part values until you find what's right for your particular unit. For resistor value mods, the best choice may be replacement with a trimmer pot and tune it in for the best sound.

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**UNMATCHED VOLUME PROBLEM:**

Many people have complained about a small volume loss when the Small Stone is switched on. My Small Stone exhibits this behavior as well. Here is a post from R.G. from Aron's Stompbox Forum on a possible fix (modifications to the circuit) for this problem.
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From R.G. Keen

The loss of volume when engaged is correctable in the Issue J Small Stone by changing the gain of the two-transistor preamp at the input of the circuit.

There are two 4.7K resistors at the emitters of the input transistors. One (R7) goes to ground from the emitter of Q1, the second (R42) connects the emitter of Q2 to the emitter of Q1. Those two resistors set the feedback gain of the two-transistor compound.

Increase the 4.7K between the emitters (R42) to increase the gain. Start with 10K. Be aware that this will affect the stage biasing, so the headroom may be affected; I don't think this will really be a problem.

The silly thing *ought* to have included a JFET buffer in front of it for buffered bypass and a bit of gain in the first place.

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Dave Matelitz reported successfully fixing this problem by making these part substitutions:

Changing R42 from a 4k7 resistor to a 10k resistor
Changing R11 from a 3k3 resistor to a 10k resistor

Tweak these two resistors until you get the volume right with no oscillation in the signal.

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COLOR SWITCH OSCILLATION PROBELM:

Again R.G.to the rescue with a post from Aron's Forum:
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From: R.G.
Date: 5/16/2000 4:21 PM

Using feedback to enhance the peaks in the frequency response of a phaser between notches is what the color switch does; there is some discussion of this in "The Technology of Phasers and Flangers" at GEO.

What happens is that the feedback ALWAYS reinforces the input signal at the frequencies midway between the notches, just as it cancels at the notches. To keep things stable, you MUST keep the amount of feedback below the input signal level (that is, the feedback "gain" must be less than one) or it will oscillate.

What is going on is that the guy upped the gain of the phase line preamp by about 2 as I remember. This increased the amount of signal in the feedback line as well. To stop the squeal, you have to cut the sheer amount of signal coming back into the input from the output of the phase line. Any of the resistors in the path from the phase line output back to the input can be juggled to decrease the amount of feedback. I personally would put in a 10K pot in series with a 10K resistor from the phase line output so I could vary the amount of feedback with a knob

instead of just having a fixed amount. I think I show this in the "Phase 180" phaser stuff at GEO. Any of the resistors will work if they cut the feedback amount.

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I got an email from Kent that changing R11 from 3k3 to 5k7 fixed the oscillation problem (with the color switch on) on his home-built Small Stone clone.

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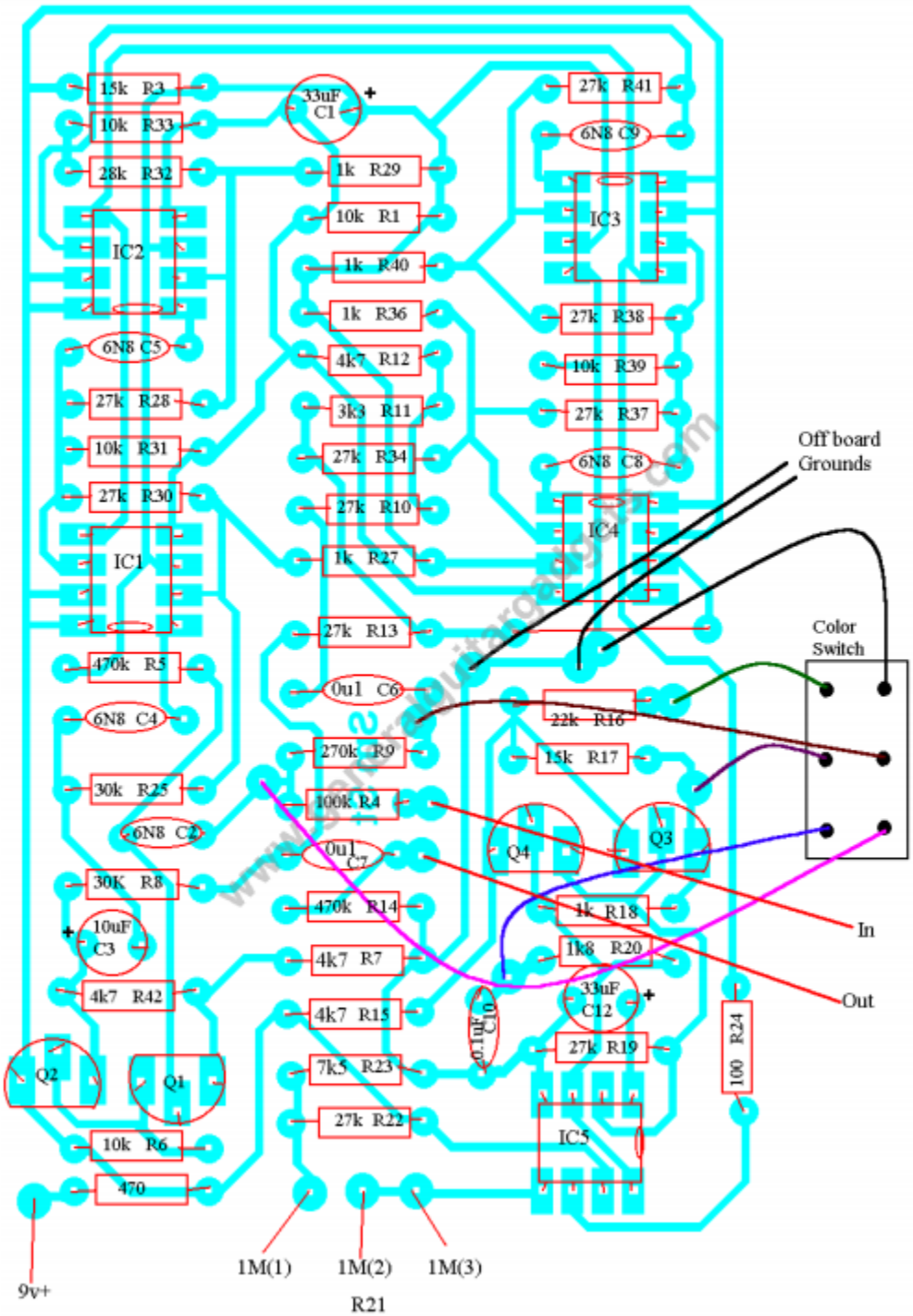
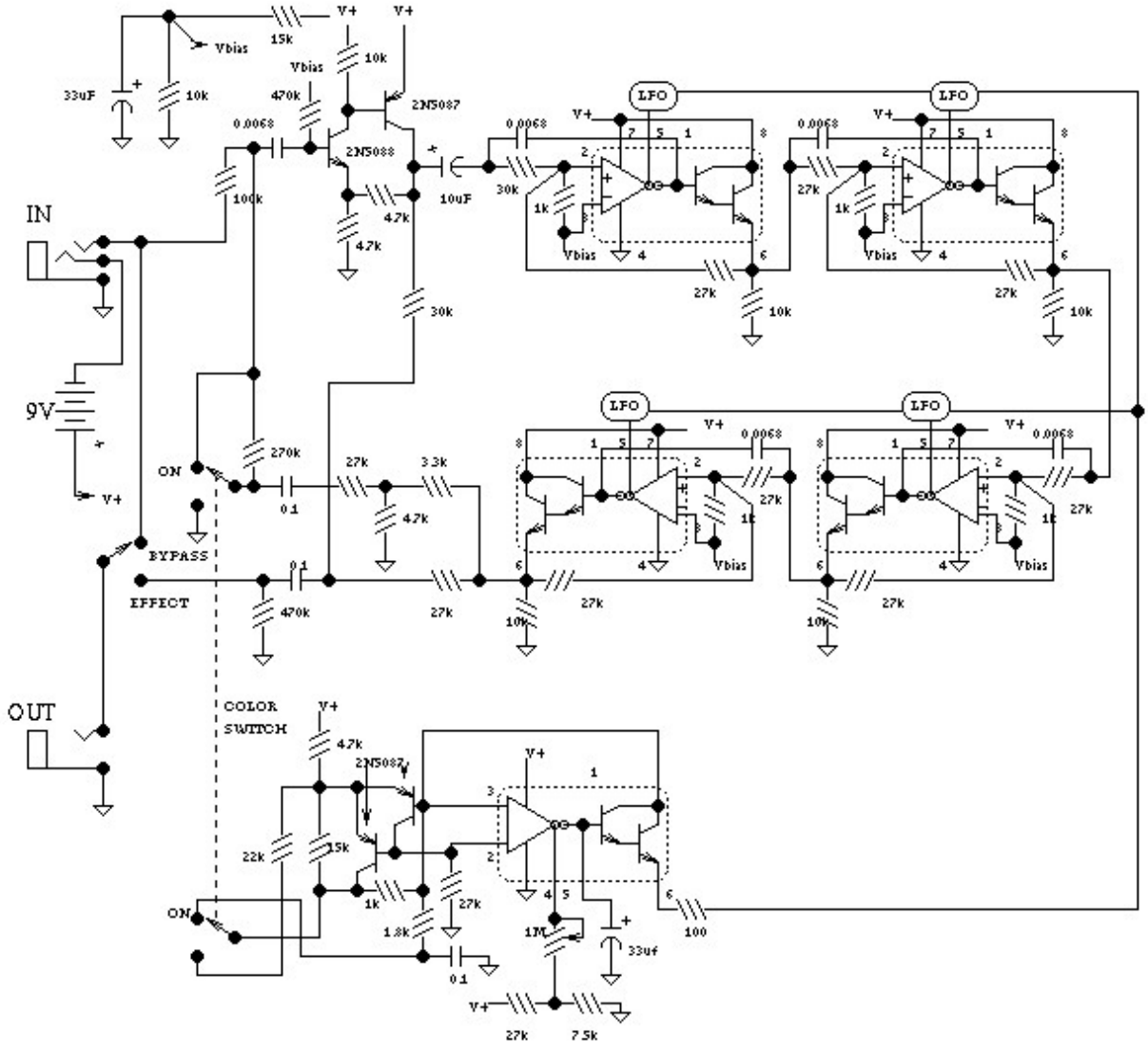


**EH Small Stone Phaser**

**Issue J**




The Small Stone is somewhat unique in using Operational Transconductance Amplifiers (OTA's) for phase shift stages instead of opamps with variable resistors. All of the IC's are house marked EH1048, but can be replaced with CA3094 which is a combination of an OTA equal to the CA3080 and a darlington emitter follower. Later Small Stones used slightly different circuits, but all used the OTA.