

Electar Tube 30: Rebuilt with Reverb and Tremolo by Mike Donovan

Background

I bought this amp from Musicyo.com a couple of years ago. In stock form the clean tone was muddled, and the overdrive was simply awful. I first replaced the speaker. This helped somewhat. I tried to do some mods, but the cheap PCB construction led to much frustration so I gutted the amp.

At the time, Steve Ahola was experimenting with the Trainwreck Express circuit in his Electar 30, so I tried some of the ideas he had generously presented to fellow Ampagers. I ended up with something like Steve's, except with a paraphase inverter instead of the split-load. It sounded pretty good, but I wanted reverb and tremolo. So I gutted the beast again and here is the latest revision.

Power Supply

Pretty standard affair. I added the two 100 ohm 5 watt resistors to knock the B+ down from 390v to 355v. This also simulates the "sag" characteristics of a tube rectifier, and limits the initial surge of current when firing up the amp. I added a standby switch. I tied the filaments to the power tube cathode resistor through 100 ohm resistors, an old hum reducing trick.

Preamp

Based on the blackface Fender, with a few mods to reduce the bass response. I reduced the 1st stage cathode bypass cap to 1uf. The "Marshall" values of 2k7 and 0.68uf work good here too. For the tone stack, I went with the "Marshall" values for the bass and mid caps (22n). Sometimes I prefer the Fender values of 100n bass and 47n mid, sometimes I go with 33n for both, it depends on the rest of the amp, the speakers, etc. I prefer to wire the midrange pot blackface-style. I used a 82pf bright cap rather than the usual 120pf mainly because I was fresh out of 120s. It works fine.

The 2nd stage cathode cap is reduced to 4.7uf. The coupling cap coming off the 2nd stage is 10n. These things combined help reduce the "flatulence" of the stock Fender circuit.

Phase Splitter

Standard Vox long-tailed pair. I fed the reverb into the normally unused half of the splitter like the Matchless Chieftain. I also fed some negative feedback there in order to cut down on some hum and hiss and to tighten up the power amp stage. It did sound pretty cool without the NFB, but it was noisy and unrefined. The 2M2 feedback resistor forms a voltage divider with the 100k reverb pot, so it's roughly equivalent to the Marshall 100k / 5k divider. I tried a cathodyne splitter and used the other half of the 12AX7 as a gain stage, like the Princeton Reverb topology. That did produce much more reverb, but I didn't like the overdriven sound as much as the long-tail.

Power Amp

Cathode biased. I originally had a fixed bias / cathode bias switch, but found I was using cathode bias most of the time for that "Vox" feeling. Also, at this point I became distressed at the general "spaghetti" situation and wanted to simplify things, so I ripped out the fixed bias. I used 1k screen resistors because I was concerned about the relatively high voltages on the EL84 plates and screens. I first tried a cross-line master volume control, but settled on the dual pot method. I found the junction of the two pots a convenient place to hook in the tremolo. I moved the output transformer to a point in between the power tranny and the EL84s. It originally was sitting over by the input side of the amp with 18" leads connecting back to the power tubes and speaker. I added a speaker jack that grounds the output when nothing is plugged in.

Reverb

At this point, I had used up both 12AX7s. I wasn't sure if the Electar power transformer could safely supply any more filament current, so I went with a solid state reverb driver and recovery stage. I've had great success with the JFET / MOSFET cascode circuit. Notice the voltages on the reverb recovery stage, they come very close to the 12AX7s fed from the same supply node. The driver stage is wired a little differently to accommodate a wider input voltage swing. Due to space constraints, I built the circuits on perfboard with flea clips. Ideally, I would have used eyelets. The MOSFET in the driver stage requires a small heatsink, the recovery stage does not. I used a standard Fender reverb transformer. The performance is excellent, as good as the blackface tube circuit, to my ears. Unfortunately the Electar cabinet will not accommodate the long tank so I am forced to use a short tank. Also, by feeding the reverb directly into the phase splitter, there is not as much reverb gain as the Fender blackface circuit. Normally I only use a small amount of reverb, so this is really not too bad.

Tremolo

I was faced with the same problem, out of tubes. I hunted around for some solid state tremolo designs but most of them used op amps or low voltage components, so I figured, why not give the standard JFET / MOSFET cascode circuit a chance? It worked perfectly on the first try. It can be adjusted to a very intense tremolo.

The sound

Well, it's a Fender preamp with Marshall voicing into a Vox AC-15 power stage. Good all around "old school" rock and roll type of sound, touch-sensitive and all that good stuff. Nice Vox-like "chime" due to the cathode biased EL84s. The master volume can be used to dial in a crunchy sound at lower volumes but it does not do the saturated Mesa Boogie thing. When the master is dimed, it is effectively out of the circuit and you can get the classic power amp distortion. The amp is plenty loud for an enjoyable listening experience in a civilized band situation.

Other Stuff

I didn't use any fancy components, mostly carbon film resistors and polyester caps, whatever I had laying around. I use the original Sovtek tubes that came with the amp. I did try some other tubes but it didn't make a whole lot of difference to me. I used a star ground method. The hum and hiss on this amp are comparable to the average blackface Fender. I can usually do much better, but with the horrible way this amp is laid out, I considered average to be a victory. Due to space constraints, I went with a very minimalist power supply, I would normally decouple every stage. This amp is a beast to work on due to the positioning of the controls, I wanted to add some other stuff like a presence control but ran out of panel space and dreaded running any more wires.

Here are pictures of the whole inside, the reverb section and the power supply / tremolo. The schematics for both the cathodyne and long-tailed version follow on the next pages.



