

DYNACO ST-70 - DRIVER 6GH8 ECF82

INSTALLATION AND USER MANUAL FOR THE AB-Q-ST70 AUTO BIAS MODULE

Introduction:

This module has been designed to maintain a constant bias voltage through all power output tubes for your ST70 stereo power amp.

The bias is kept at a constant level on the output tubes, irrespective of the signal level.

Please note. The preset bias level for this AB-Q module, see below for details, will differ depending on whether your ST70 uses the EL34 power tubes.

6.3V AC windings for tubes are **not grounded!**

Benefits:

The advantage of using the AB-Q module is that it will extend output tube life, in a lot of cases it will also improve the sound and last but not least, you will never have to worry about adjusting the bias again.

- Instead of a pair of output tubes being biased together, now all four output tubes are individually biased for greater control and stability
- No need to keep an eye on and/or adjust the bias of the output tubes
- Significant extension of the output tubes life
- Bias is not influenced by the input signal
- Undistorted and improved sound for a great listening experience
- Reduction in hum and noise level of the amp
- No maintenance or additional adjustments are required after the initial setup
- Improved overall operation of the amp due to the reduction in the danger of a tube red plating
- The AB-Q ensures that bias is kept at the pre-set value (see Initial Setup) even as the tubes age
- The AB-Q comes with a soft start feature, which slowly brings up bias to each output tube

Quick Overview:

The AB-Q module has four **blue** LED's, one for each output tube, which when lit, indicate that bias is at the correct level and that all is good with each tube.

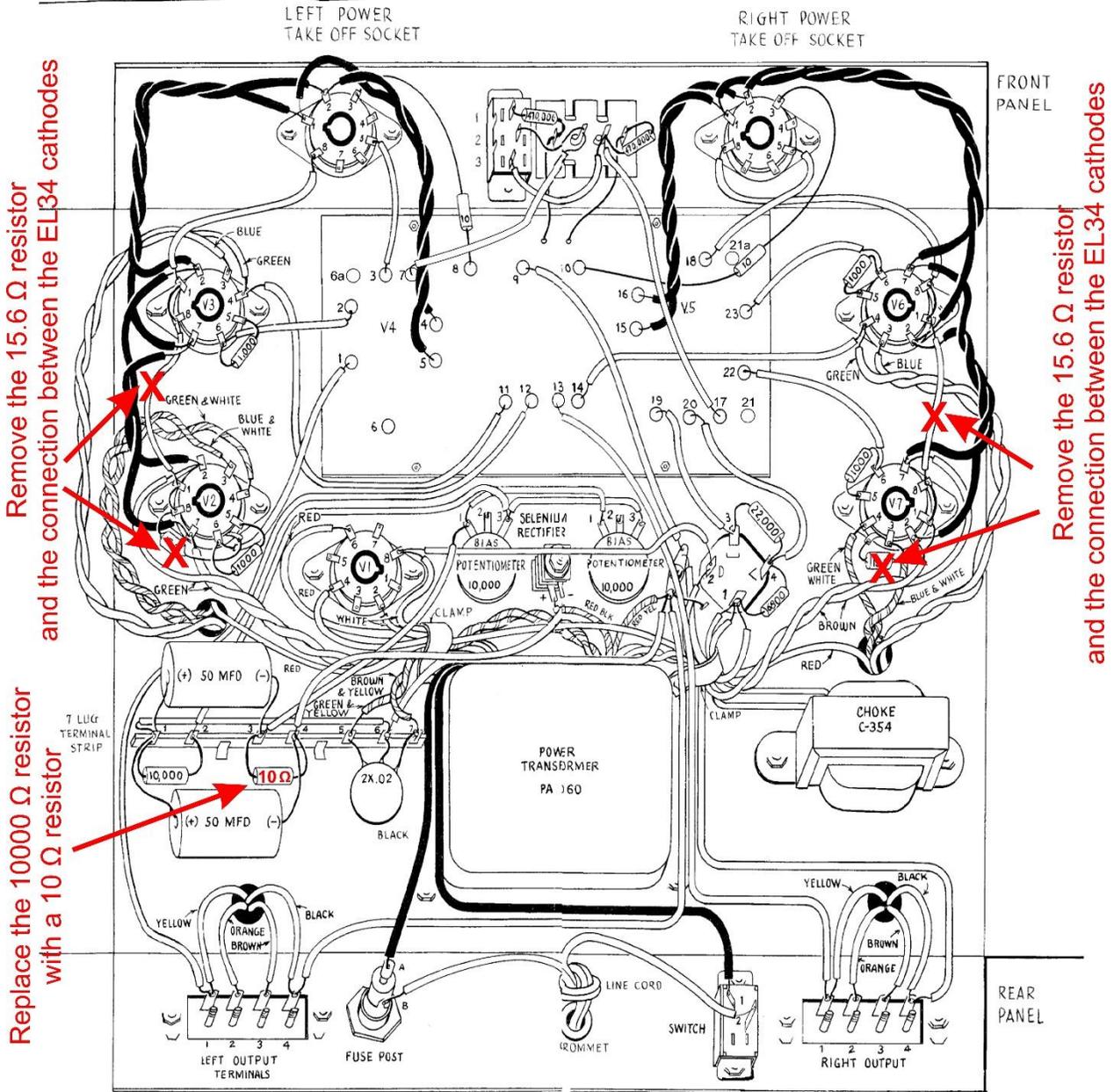
Should any of these **blue** LED's go out or not go on after power up, means that there is an issue with that given output tube and that the tube in question needs to be immediately replaced.

When the amp is powered up, at first a **red** LED will be on, indicating that there is power to the AB-Q module. The **red** LED will go out after about 20s.

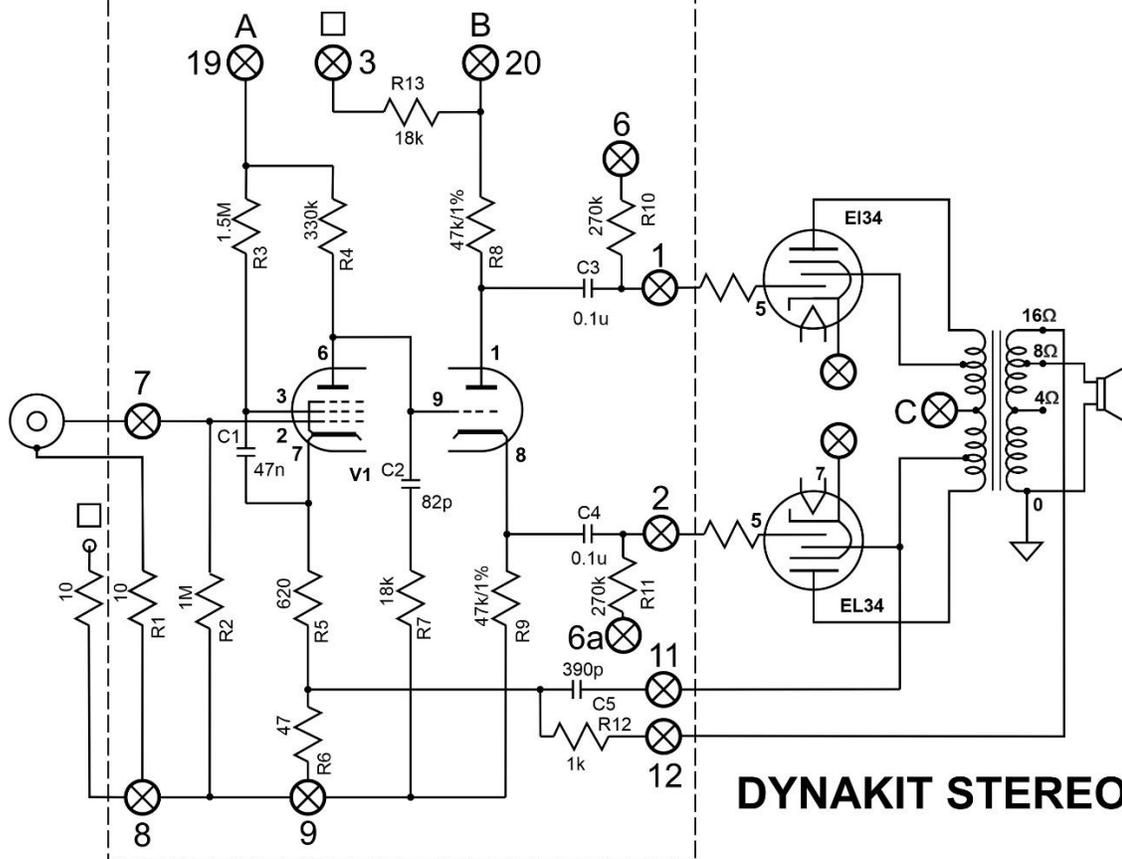
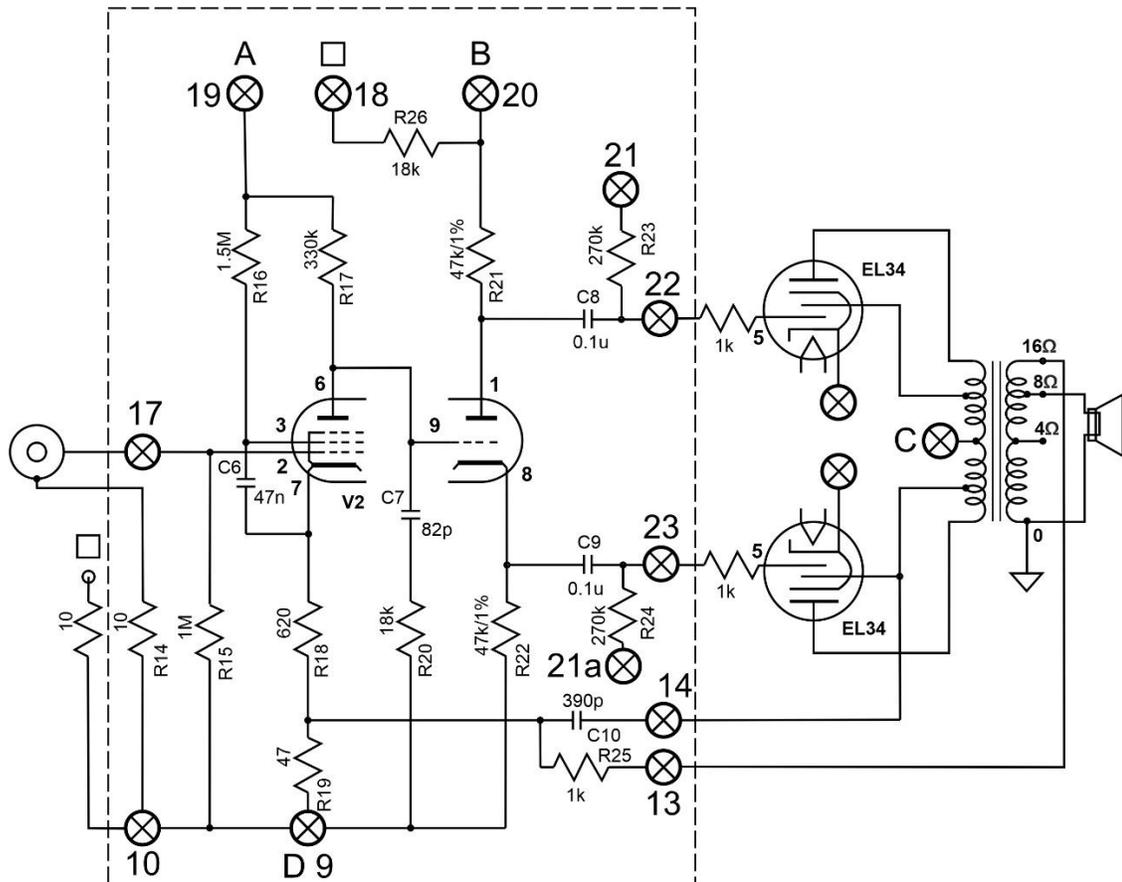
After a further delay of between 40-50s, each of the **blue** LED's should come on indicating that the bias is now set and stable for each output tube. The amp is now ready to use.

Preparing the ST70 for the installation of a new PC-3 driver and AB-Q module:

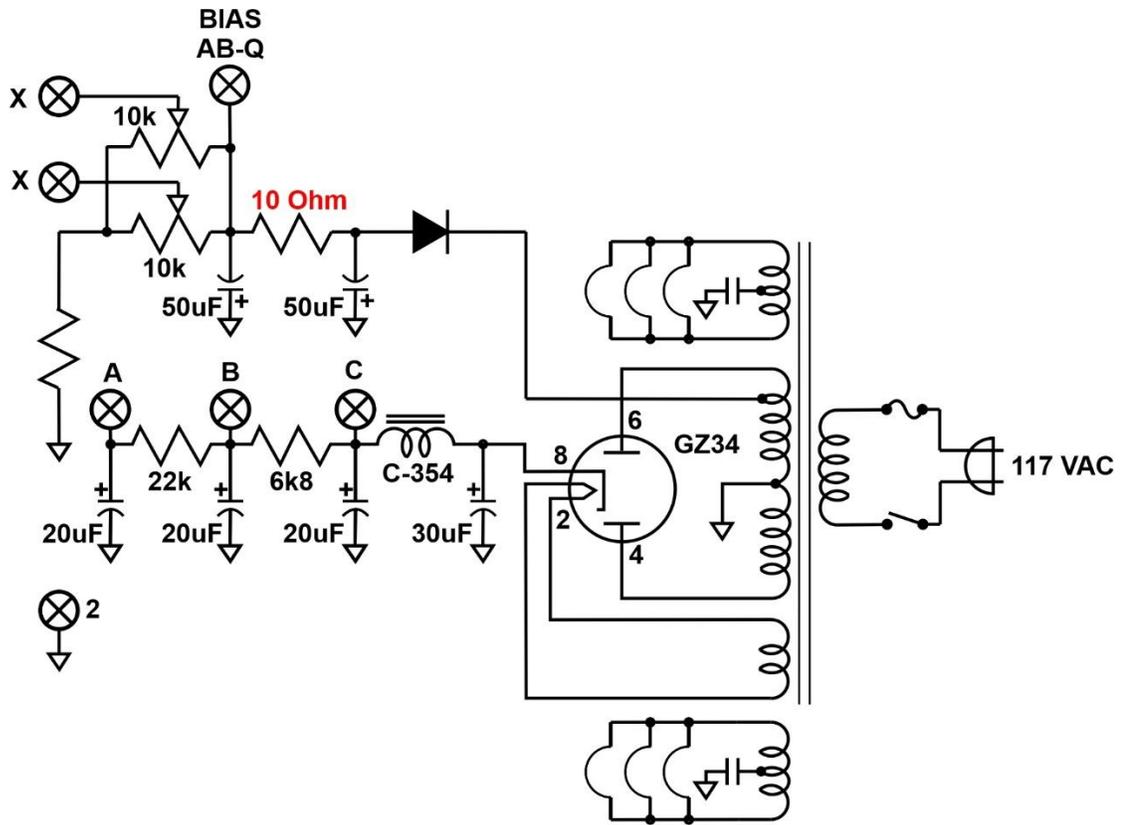
You will need to remove the original 15.6 OHM cathode resistors and cathode connecting wires V2-V3 and V6-V7 according to the following photo.



1. Remove the four 15.6 OHM bias resistors marked Rcatch V 2 to Rcatch V 6 and disconnected to wire cathodes V 2,3 to V 6,7
2. Install a new PC-3 driver board. The AB-Q module set also came with new spacers and screws. Use them to reinstall the new PC-3 driver and connect all the original wires to the numbered points on the driver.
3. Points 6 and 21 are disconnected from the bias potentiometers.
4. The wires can be connected to the AB-Q from above or below, depending on your taste. They are usually connected from below.
5. Points 6, 6a, 21, 21a will be connected to the AB-Q module according to the diagram (GRD pads V2, V3, V6, V7)
6. According to the picture we connect the cathodes V2, V3, V6, V7 EL34 to AB-Q (pads CATH V2, V3, V6, V7).
7. It is necessary to maintain the exact order of the wires as shown. Change of positions the connections will destroy the AB-Q module!
8. The wires in the two 6,3 AC pads should now be tightly twisted, as these are the 6.3VAC supply wires for the AB-Q module and being AC, have to be twisted to ensure hum free operation!



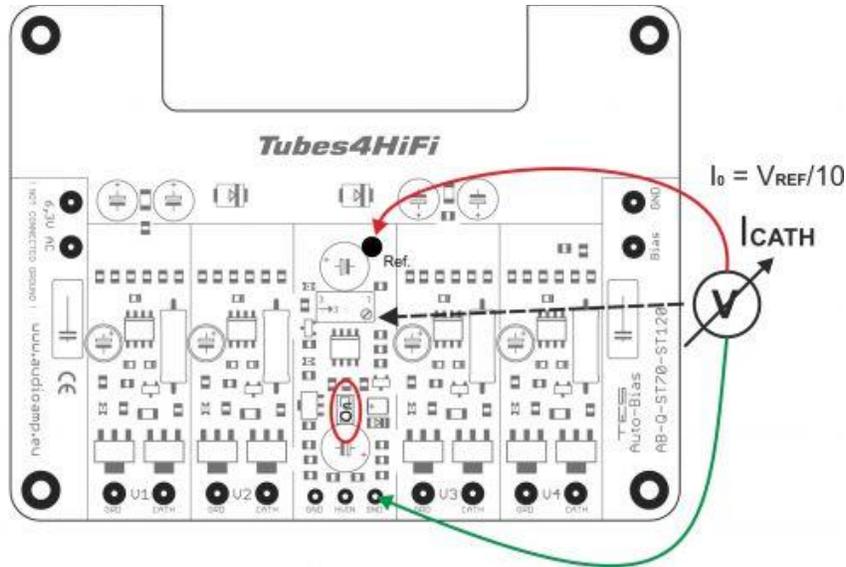
DYNAKIT STEREO-70



1. 1M Ω potentiometers must be connected to inputs 7 and 17 of the PC-3 driver. If these potentiometers are not present on the amp, 1M Ω resistors (R2 and R15) must be connected to ground at inputs 7 and 17. If this does not happen, the PC-3 driver will fail and the signal will have significant distortion!
2. The AB-Q ST-70 module is already preset to a cathode current tubes EL34 of 38 mA. There is no need to set it again.

If you want to set a different cathode current on the EL34, follow these steps:

That's it, you just set the AB-Q module to the desired bias operating level. For EL34 $V_{ref} = 0.380V$. It is set without signal.



Keep all of the above wires neat and tidy, maybe use zip ties to group them.

This now pretty much completes the wiring of the AB-Q module to the ST70 driver PC-3 pcb and the power tubes.

Double check all the wiring steps again, even triple check them ☹

Once you are confident that all your wiring is correct and as per the above steps, it is time to test your AB-Q module installation. We are assuming that you have installed the AB-Q module into a known working ST70, not a brand new ST70, as you would need to carry out a different sequence of testing your ST70 before you should power up the AB-Q module.

Plug in all tubes, that is the driver tubes, power tubes and the tube rectifier.

Maybe stick a piece of styrofoam under one of the output transformers to cradle the ST70 chassis so that the tubes do not touch the bench top.

Connect an 8 OHM dummy load of at least 100W capacity or your speaker and if you can, short the input using a dummy RCA plug.

Power up your amp. The red LED on the AB-Q module should come on straight away and will go out after about 20s.

After an additional 40 to 50s, each of the blue LED's on the AB-Q module should start to come on, which indicates that each output tube has reached the preset bias level and all is good. Excellent!

You can measure the actual bias voltage on each output tube with a meter just to double check.

Set your volt meter to the 1V, 2V or 5V scale in DC volts. Put the red meter lead on pin 1/8 on a power tube socket, V 2,3, V 6,7 and place the black meter to the chassis star ground tag. The meter should read close to 0.380V/380mV if EL34's are used. This reading might be a little higher to start with and will get close to or exactly to the preset bias voltage as the output tubes warm up.

Do this measurement for each output tube, V2, 3, 6 and 7, measuring at pins 1/8.

Leave the amp running for about 10 minutes, all four of the blue LED's should remain lit.

Power down the amp and let everything cool down a bit then put the bottom chassis cover back on.

Remove the dummy RCA plug.

Place your ST70 amp in its spot, connect your speakers, RCA input and power lead to it and power the amp back up. After about a minute or so, the amps are ready for your listening session!

If things do not work as they are supposed to:

If the **red** LED on the AB-Q module does not come on immediately after the amp is powered up, power it back down and check the wiring/connections from pins 2 & 7 on the V3 socket to the two 6,3 AC pads on the AB-Q module. Make sure all is good there!

If none of the **blue** LED's come on after the 40-50s soft start delay, power the amp back down. Check all your wiring from the AB-Q module to each of the output tube pins and to the ST70 driver pcb.

If say only three or two of the **blue** LED's come on after the soft start delay, power the amp back down and check the wiring to that particular tube for which the **blue** LED did not go on for. Also check to make sure that the pins in that tube socket are nice and tight and that the tube fits into the socket not at all loose. Also check the pins in the tube socket of any oxidization, if they are dirty, perhaps use Deoxit or similar to clean the pins!

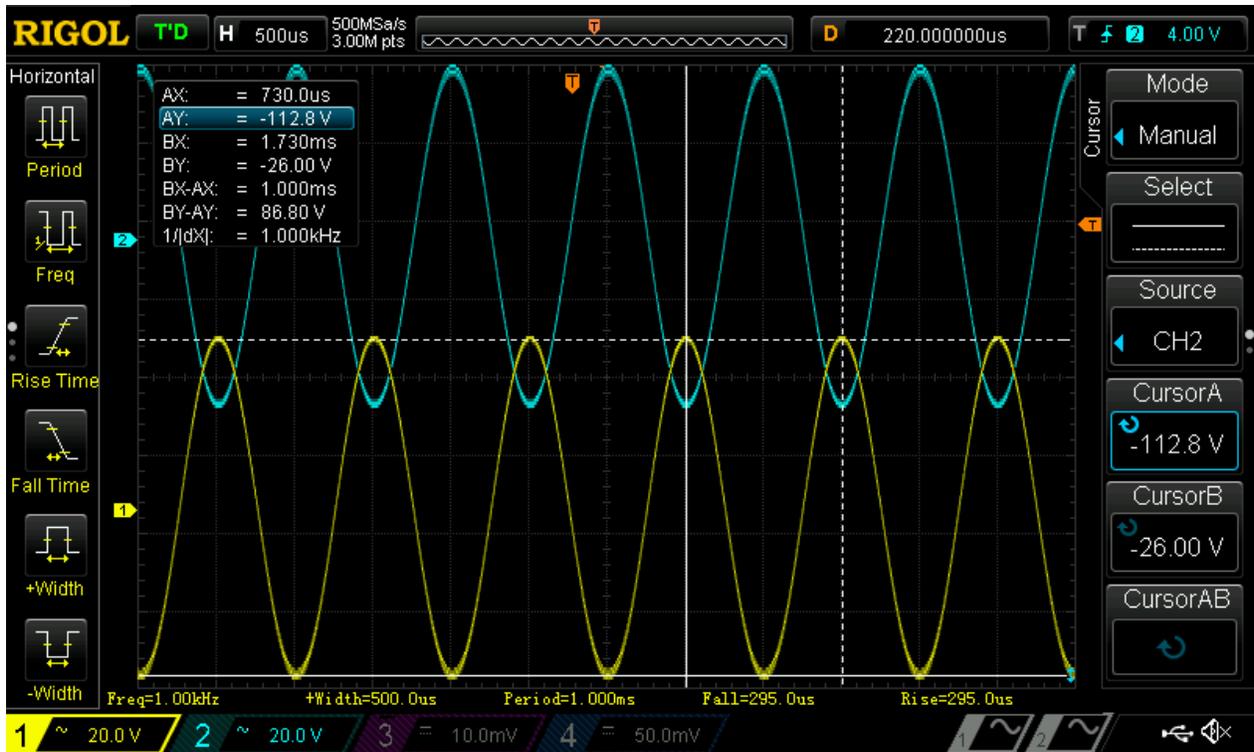
Do's and don'ts:

Do check that the pins in each tube socket are tight and that each tube does not fit loosely in the socket. Do check that the pins in each tube socket are clean of oxidization, use Deoxit or similar if they are not clean.

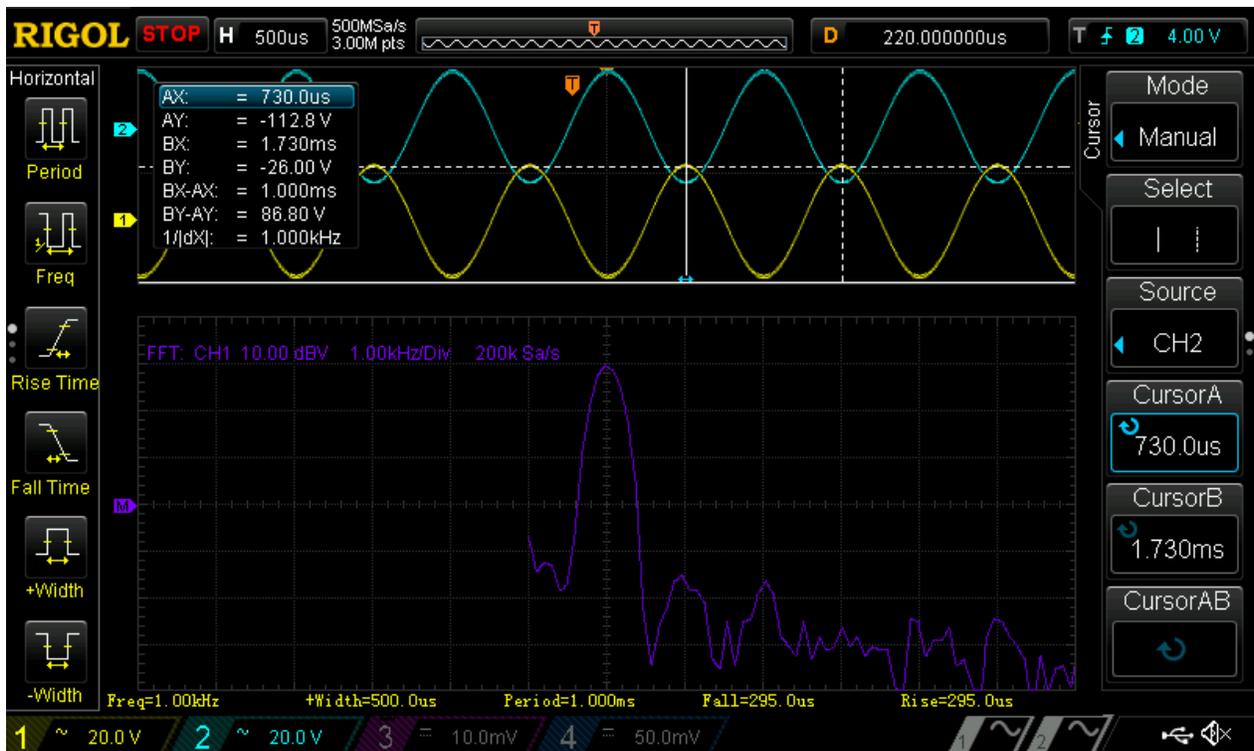
Good fitting and clean pins in tube sockets make ALL the difference!!

Don't do a lot of tube rolling! This is a sure way to loosen up the pins in your sockets! If you cannot help yourself and you must do tube rolling, check the tightness of the pins each time you swap tubes!

Measured results:



Output from signal inverter for EL34 - 86.8 Vpp.



FFT synthesis - distortion: second harmonic frequency - 0.5%, third harmonic frequency - 0.4%