

Hints and Kinks

For building high power

VHF and UHF

Amplifiers

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The output cavity on 144 Mhz consists of a ¼ wave line section about 17 inches long and mechanically grounded at the end without a bypass. Actually 17 inches is the total length including the tube and sleeve.

Instead of constructing the bypass at the cold RF end of the ¼ wave line I stop the grounded portion of the line an inch or so before it reaches the tube anode and fabricate a sleeve which slips down over the tube and extends up over the mechanically grounded pipe about 3-4 inches with 15 mills of Teflon or Ultem between the sleeve and the grounded pipe which ends up at the cold end.

The only voltage between the sleeve and insulated from the grounded pipe is high voltage.

No RF appears between the sleeve and the grounded pipe since all RF flows on the surface and doesn't enter between the sleeve and the grounded pipe. Capacity for an overlap of 3-4 inches is so high that it looks like a dead short at RF frequencies.

This is far simpler than trying to build a bypass at the cold RF end of the ¼ wave coaxial section.

Output probes and tuning discs are placed as close to the tube end as possible in order to be able to couple power out and tune the coaxial line section.

In the case of the 2 meter coaxial output section, HV can simply be run down through the inside of the pipe which is grounded and clipped onto the anode of the tube.

No bypass is needed since there is no RF inside the grounded pipe.

432 Mhz Requires a ½ wave long coaxial line section on the GS23b.

It turns out to be 4 ¼ to 4 ½ inches from the bottom of the GS23b anode to the top of the tubing which then equals a ½ wave long line including that part of the ½ wave which is swallowed up inside the tube..

Output probe and tuning probe are obviously located at the very top end of the 4 ¼ inch tube.

Several different configurations have been used for the screen and grid bypass capacitors.

I have used a bypass 6 inches square of brass (DO NOT USE PC BOARD) for both with the tube in the center with finger stock. 15 ml Teflon or Ultem can be used as dielectric for both. Capacity runs around 6-700 pf. I have also tried grounding the screen directly, using a bypass only on the control grid with the cathode floating. Grounded control grid with bypass on the screen with the cathode floating has also been used.

All work equally well once you get your head around the idea that the cathode doesn't go to chassis ground.

For a HV feedthrough bypass on 432 I have resorted to a plate of round 1/8 inch 3 inches in diameter disc of aluminum insulated from the wall of the box with 15 mils of Ultem or Teflon. I HAVE SUSPECTED THAT A HIGH CAPACITY .005 OR SO CONTRIBUTES TO FLASHOVER PROBLEMS.

I make a shoulder washer to hold the disc of 1/8 inch aluminum to the wall with lots of clearance for the 8-32 screw which holds the sandwich together. RF choke on 432 consists on 4-5 turns of #18 wire an inch long about 1/2 inch in diameter and attached to the very bottom edge of the 4 1/4 inch sleeve which is the 1/2 wave plate resonator.

Now for a couple of tips.

Instead of going through all the trouble of finding a big chunk of teflon with which to make a chimney, I found that a block of STYROFOAM can be cut on a band saw or other means to build a cheap chimney.

It is totally invisible to RF up to 10 Ghz and I've been using it for years.

Should you break it, you can knock out another in a couple of minutes.

Next, In order to clamp the output probe in place after you have located the optimum coupling point do this.

Go to the hardware store and locate the section where they sell compression fittings to couple two straight pieces of 1/2 inch or larger copper tubing together.

They are double ended. Cut it in half producing two pieces.

Remove the ring inside and cut a slot in the ring so that you won't permanently lock the probe in place. Now you can lock down the probe and by unscrewing the collar you can loosen it up again.

I solder the thing to a square plate and bolt it to the side of the box into which I have built the amplifier.

Ever had a FLASHOVER in your high power amplifier?

Here's how to stop it.

Always put a 10 mfd electrolytic between control grid and cathode right at the chassis where your feedthroughs come out of the chassis.

I have seen 1 inch sparks in my power supply at the instant it flashes over.

I suspect it's an audio parasitic which is triggered by who knows what.

The 10 mfd will kill it. Guaranteed

My thanks to all the people who have helped me over the many years are due.

Here's a partial list.

W7QX, K5GW, K1RQG, K5JL, VE4MA, K5SO and W5LUA

73

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