ICOM 720A RF PREAMP

9th October 2000

Images updated March 2010

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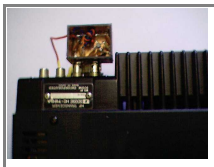
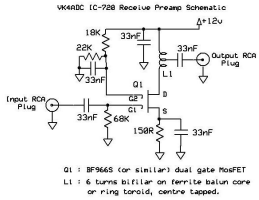
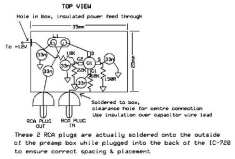


This is how the preamp fits to the back of the transceiver



The preamplifier schematic



The parts layout of the preamp within it's box.

- Pre-amp plugs into the two RCA sockets on the back of the IC720A in lieu of the coax link.
- Gives a gain lift of 8 to 9dB (measured) to the receiver over the 3 to 30 MHz range.
- Noise figure is determined by the MOSFet used but is low enough to make the receiver hear the noise from the antenna when it is connected, even on 28 Mhz
- Powers off +12v from the unused power input socket or other suitable source.

Original units used BF966S dual gate MOSFets although others could be substituted. The output inductor was built in two styles – (1) a standard 2 hole balun core and (2) a ferrite ring about 10mm diameter and 4mm square cross-section. The balun core was wound with 6 turns bi-filar of enamelled wire. The ring toroid was wound with 6 turns bifilar of thin PVC insulated single strand jumper wire. Both inductors were essentially centre-tapped.

The pre-amp was built directly onto double sided PCB material formed into a soldered-together box. The critical dimensions are the RCA to RCA plug spacing, clearance to the main antenna connector SO239(/PL259), the PA heatsink on the RHS and the other RCA connector on the the RHS. The height should not exceed the top case level. The final size of these boxes was about 35mm by 25mm by 25mm but final dimensions are not critical.

The RCA plugs used were a low-cost type which were originally supplied with plastic shrouds. They look like a bit like a bell with a 2.5 to 3mm hole in the top and the centre pin underneath as the ‘gong’.

The components were soldered to the inside PCB and hold the FET in mid-air. This is possible only because of the few components involved and 3 of the 4 leads have components going to ground.

CONSTRUCTION HINTS :

- Cut 1st piece 35 x 25mm of PCB material. Locate against the 2 RCA sockets to get the centre lines and mark the holes about 10mm from the long edge.
- Drill the holes about 5mm dia. Drill another a 1mm hole in the centre of the material.
- Solder a wire through the 1mm hole from one side of the material to the other to connect the two planes together.
- Push the RCA plugs into the sockets and then solder the RCA plugs into the holes in the PCB material.
- Solder a 35 x 25mm piece to the 1st to form the bottom of the box.
- Solder 25 x23.5mm pieces (approx – less the material thickness) to each end.
- Solder a 32 x 23.5 back piece to complete the back part of the box.
- Drill a 2mm hole in the side closest to the RCA plug and about 7mm from the bottom rear corner for the power input wire.
- Sleeve one lead of the input and output capacitors with about 10mm of PVC and then feed them into the RCA centre pins from within the box.
- Solder the power supply bypass capacitor to the bottom so that the free lead is adjacent to the power inlet hole but about 3-4 mm away.
- Wrap the leads of the bypass capacitors around the resistor leads for the 22K G2 and the 150 ohm source resistors and leave about 5mm of lead length on the resistors.
- Solder these components to the MOSFet and orient G1 toward the input capacitor pigtail. Solder the two earthy ends to the PCB base or side to hold the FET in mid-air.
- Solder in the 68K G1 resistor from G1 to ground and attach the input capaitor pigtail.
- Solder in the 18K resistor from G2 to the supply bypass capacitor.
- Solder in the output coil so that one end goes to the supply, the other to the Drain of the FET and the centre point to the output capacitor's pigtail.
- Feed in a wire through the hole in the side to the bypass capacitor for power input.
- Cut a top piece of PCB material about 35mm x 25mm to add after testing.

TESTING :

- Drain should be at supply voltage (about 13.6V)
- Source voltage should be about 0.6 to 0.8V
- G2 voltage should be about 7.5V +/- 1 volt.
- Without the amplifier connected (ie. with the original shorting coax link in place), find a steady signal about 10 to 20MHz. Try 11.030 as there is always a weather fax transmitter up. Check the received signal on the meter.
- Plug pre-amp in to the transceiver in lieu of the coax link and check the receiver signal level again. The meter should be about 2 to 3 'S' points higher, depending on calibration.
- Final step is to set to 28MHz and check that connecting an antenna raises the background noise – ie the noise figure is less than the basic receiver noise figure.

After testing has proven satisfactory, add the top PCB piece by soldering a short piece of pigtail wire over each of the 4 corners to hold the top in place.