

Collins 76F-1 Amplified Speaker

Electronic Rebuild/Redesign



Preface: The Small Print

When using the information on these pages for your work please note the following terms and conditions. By using any of the information presented you accept these terms. Thank you!

Restoration Projects Philosophy

The purpose of many restoration projects described here is to bring the antique equipment back into working condition close to original specifications while generally preserving their historic electronic and mechanical design. This means that often new components (e.g. capacitors) need to be used - in many cases NOS will not do - which sometimes require small mechanical modifications to the set.

This treatment does not conform to "museum" standards that require everything to be left or restored to original. This is an entirely different approach. It is up to you to decide what you want to do.

Modifications and Homebrew Projects

The projects shown are for information only with the main goal to motivate fellow amateurs and hobbyists to start on similar projects. Comments for improvements are always welcome. They are always "prototypes" and not a kit. You'll have to find your own parts. No warranty is given nor implied that they actually work in your situation.

And please note that a modified piece of equipment loses its collector value - but brings joy to its successful operator!

Copyright

Some of the circuit diagrams, manual pages or software used and edited are covered by copyrights of their original publishers and intended here for personal use only. No complete manuals can be found, there are already many sources on the web for this purpose.

My personal designs are covered by the [GNU licence agreements](#). Pictures and other documents may not be republished without indicating the source.

Regulations

Many of the described obsolete radios (or computers) no longer fulfill today's requirements for e.g. electrical safety, EMC, used bandwidth, levels of harmonics or spurs or intermodulation. While at times suitable corrective action is included in my descriptions, many times it is not. It is your responsibility to make sure your equipment conforms to the requirements in your own country.

Safety while Working on the Projects

It is your own responsibility and all-important to always observe proper safety procedures in your work. Some of these projects - certainly almost all vacuum-tube circuits - involve high voltages, some lethal indeed. Make sure you understand what you are doing or else get some qualified help here. Just look at [this page](#) to see some tips on this one.

Always "Switch to Safety" when you work on your equipment! Please pay attention to proper grounding of all metal chassis and enclosures and consider the use of GFCI breakers to your shack/workbench.

This information and much more can be found on my website hb9aik.ch

1. Original Circuit

The speaker box was without its amplifier but otherwise complete. The original circuit requires unavailable special parts such as T1, RT1, RT2 as shown below:

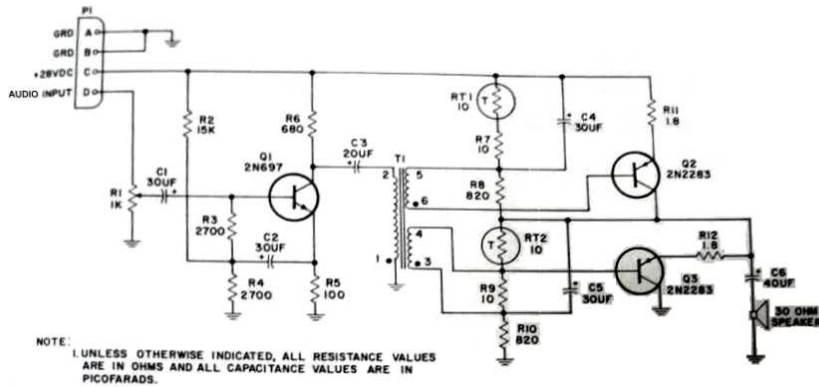
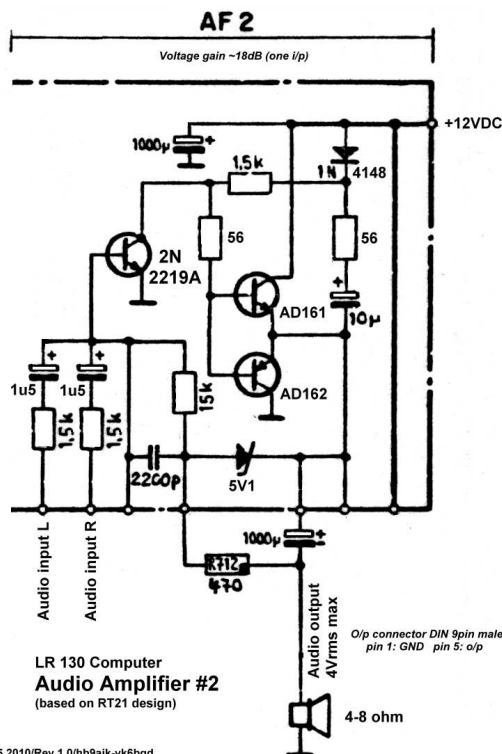


Figure 4. 76F-1 Speaker/Amplifier, Schematic Diagram

2. New Concept

It was decided instead to build a new amplifier into the box based on a surplus card and design from a BBC RT21 radio. This design uses complementary germanium transistors in its output stage, no transformers or NTC resistors and the circuit is very simple and provides low crossover distortion.



This shows the basic circuit as built for another purpose again following a computer sound card output and combining the L+R channels. If no transistor pair is available, the NPN type can be replaced with no ill effect by a NPN-PNP Sziklai pair where the NPN is a silicon transistor and the PNP has to remain a germanium type.

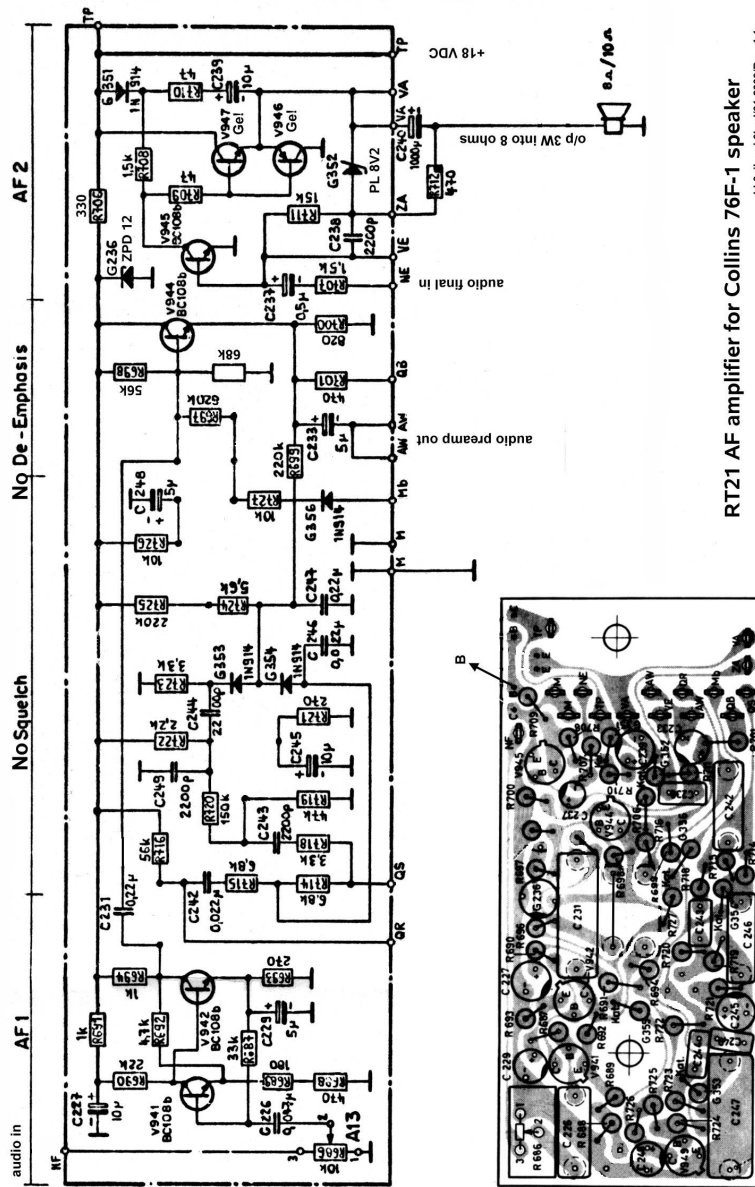
3. New Circuit

Here follows the circuit diagram of the amplifier used in the 76F-1 speaker and shown in other pictures below. Some elements are not shown here but on the pictures only.

A dual 10k potentiometer is used to control the audio level at A13 and between preamp and final stage.

Two TO-3 ASZ16 power transistors are used, V945 combined with a 2N2218 to form a NPN-PNP Sziklai pair (not detailed in diagram below) to simulate the NPN element needed. This allows higher power than the TO-66 AD161/162 pair shown above. The amplifier is short-circuit-proof.

The supply voltage here is +18V, it can be less at reduced power but diode G352 has to be adjusted accordingly to maintain 1/2 supply voltage at VA. +18V should not be exceeded due to the ASZ16 limit. The supply line is bypassed with a choke and a 1000uF capacitor.



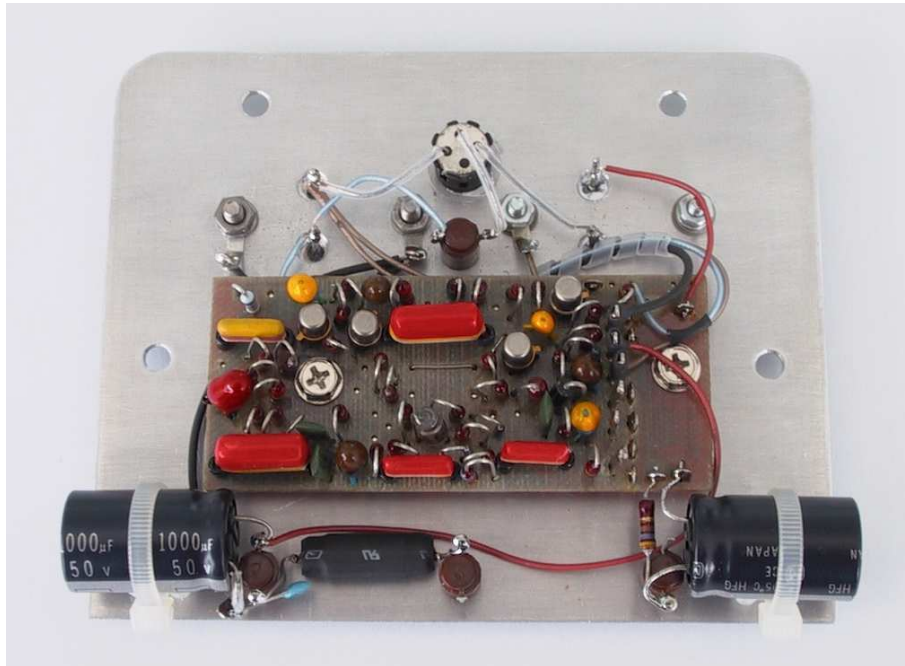
RT21 AF amplifier for Collins 76F-1 speaker

hb9aik - vk6bqd/01-2009/Rev. 1.1

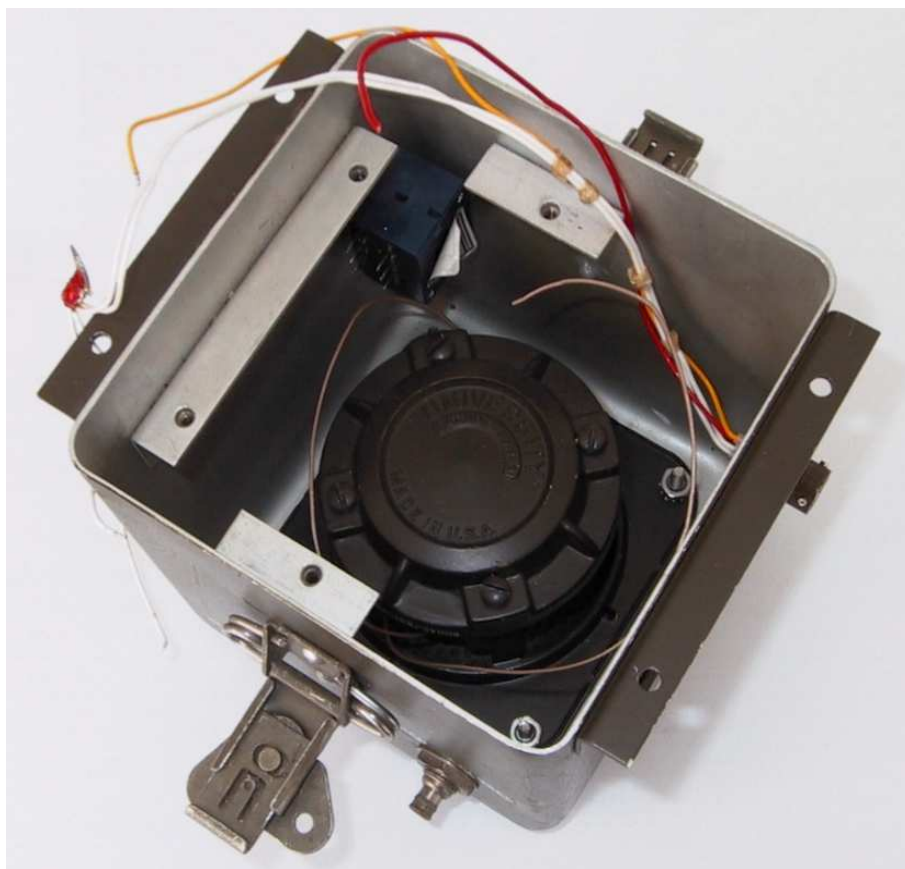
Obviously the preamp circuit is rather an „overkill“ but was already assembled – something simpler is just as useful!

4. Pictures

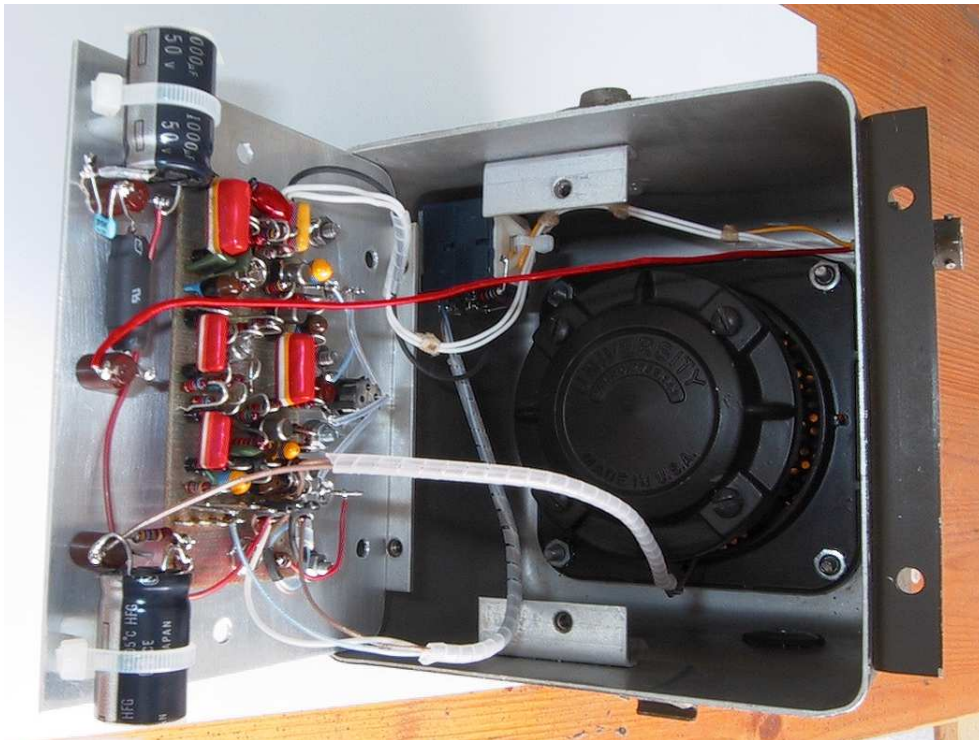
This picture shows the assembled amplifier configuration ready for installation:



Here the box is shown with speaker and potentiometer installed.



The amplifier is fitted and wired into the box and bolted to the existing support brackets.



The box is ready to be closed, the amplifier plate acts as a heat sink for the ASZ16.



The completed speaker unit – successfully tested with my Collins 671U-4 radios.

