A Clansman Headset Tester

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Various versions of the "Clansman" headsets have been knocking around for some years now, decent ones are to be had on Ebay for a few pounds. Recently I was given a large bagful of them complete with the pressel boxes "to see what I could make of them". These headsets are quite comfortable to use, have a dynamic microphone and can be adapted to most rigs, they are reputed to have cost the Government several hundred pounds each. I have never been able to see why so many so-called Radio Amateurs are eager to line Bob Heil's pocket as these units give very good communications quality results.

However, apart from the physically damaged ones, as expected those I had been given had various faults such as noisy leads, inoperative microphones and most commonly crackly pressel switches, so I decided to knock up a simple device for testing them.

These assemblies consist of the headset proper which includes a dynamic boom microphone and a short cable connected to a Plessey 7 pin plug. Each earphone is wired separately (stereo?) The plug is connected to a "pressel box" which incorporates RF filtering components and a double pole microswitch operated by the send button. One pole is in series with the microphone so that in the event that more than one headset is connected to a radio only the microphone actually in use becomes operative. The other pole operates the PTT of the connected radio. On most units the microphone switch can be shorted out by loosening a screw on the bottom of the unit, sliding a small metal plate across and re-tightening the screw.

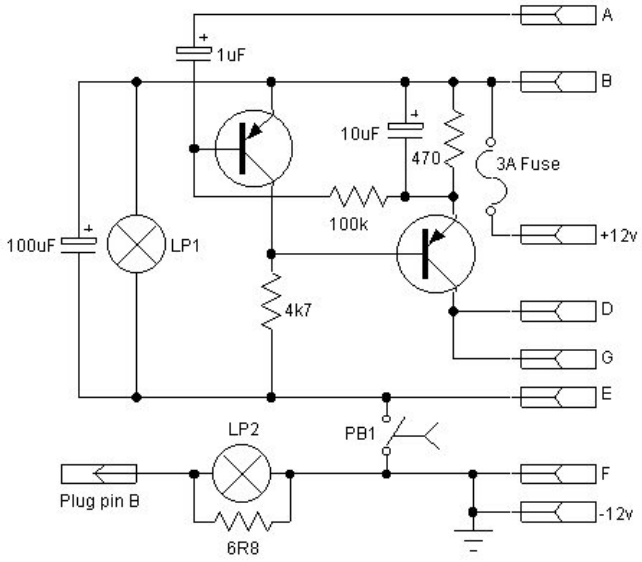

Fig. 1. Circuit of the tester. The connections labelled "A-G" refer to the headset socket. That labelled "Plug pin B" is a free plug on a short lead used for repairing noisy pressel switches. The 6.8Ω resistor is a 5 watt component.

Tester Circuit

The circuit finally arrived at is shown in Fig.1. It consists essentially of a simple two-transistor amplifier, the microphone is connected to its input and the headphones to its output so speech from the microphone is reproduced in the headphones. Germanium PNP ACY20 transistors are used in the original design, but virtually any type could be used, or NPN ones if the supply and electrolytic capacitors are reversed. Silicon types work equally well. So why did I use germanium? For one thing I have a bagful of ACY20s. Another reason – nostalgia. This little amplifier circuit was published in the late 60's in a series called "Take 20" by Julian Anderson that ran in Practical Wireless back then: each article described a circuit that used no more than 20 components and cost no more than 20 shillings to build. No chips back then. The original design used an OC71 and OC81 and would drive a small speaker – it is one of those circuits that has stuck in my mind ever since. Happy days! A 12 volt supply is used - the fuse shown is essential as it will be seen that parts of the headset are connected to the positive supply and part to the negative. A short within the headset – and it does happen – could otherwise have disastrous consequences.

Some of you may remember that a while ago I wrote that noisy pressel switches can be "cured" by passing a current of 2 – 3 amps trough them for a few seconds whilst operating the switch several times, so I incorporated a refinement into the tester to provide this function as well.

Pin	Wire Colour	Function
A	Red	microphone
B	Green	Switched side of microphone
C	Not used in headset	DC supply from radio
D	Orange	Left earphone
E	White	e/p and pressel common
F	Black	Pressel switch
G	Blue	Right earphone

Table 1 - Clansman Headset plug wiring

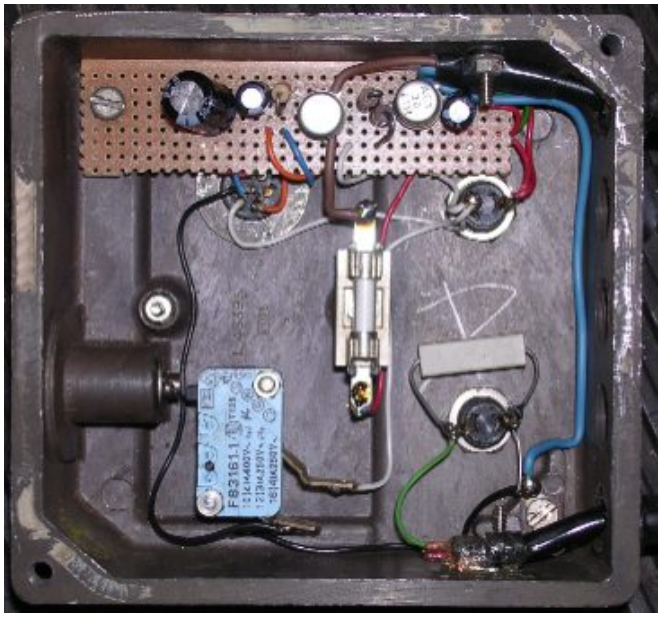

Fig. 2. Interior of the tester built by the author.

Construction

Construction is not at all critical – I built the amplifier on a strip of veroboard and assembled the unit into a small diecast

box that had once contained something uninteresting – a TV distribution amplifier I think. Supply is via a yard or so of twin lead so it can be connected to the shack 12 volt supply or used in the field from a vehicle battery. It could equally be made self-contained by incorporating a small 12v gel battery, or if the pressel repair function is not needed, made up as a handy size pocket unit run from a PP3.

Fig.3 The tester in use

In Use

The tester works as follows: The headset to be tested is plugged into a pressel box which is in turn plugged into the tester. The headphones are connected between D/G and E, and the pressel switch is connected between E and F. Pressing the switch completes the circuit from the amplifier to the negative supply and also lights LP1, indicating that the pressel is working. If all is well the operator should be able to hear the mic signal in the headphones. If the microphone capsule is good the slightest room noises should be clearly audible. At this point a noisy or intermittent pressel or lead will reveal itself. PB1 was provided on the unit to enable headsets to be tested without a pressel box. It will be obvious if the microphone or either earphone is open circuit and it will then be necessary to dismantle the unit to trace the break. If there is no result at all, try the headset directly in the tester and press PB1 in case the pressel unit has an open circuit switch or cable.

Astute readers will have noted that the collector current of TR2 passes through the headphones – the current here is about 10mA and insufficient to unbalance the armature in the Clansman headphones so it is not a problem.

Noisy Pressel units

To cure noisy pressel units the headset plug is removed from the pressel unit and replaced with the free plug from the tester. It will be noted that pin B of the pressel unit plug, which has the microphone switch connected to it within the pressel unit, is connected to the positive supply of the tester. Pin B of the free plug is connected to the negative supply via a parallel combination of a 6.8Ω resistor and LP2. Pressing the switch on and off in rapid succession causes a current of 2 or more amps to be passed through the microphone pole of the switch – waggling the switch a few times soon results in the LP2 not flickering, indicating a cure. Don't hold the button down for more than a second at a time or you risk burning out the RF chokes that are in series with the switch within the pressel unit. Plugging the headset back in will confirm the result.

Stubborn cases

If the switch remains noisy it will be necessary to dismantle the pressel unit – you do this by undoing the nut around the headphone socket and pushing the innards out of the box. (I once came across someone who told me that the only way into the pressel units was to hacksaw them open – he was amazed when I demonstrated the reality!) Reconnect the unit to the tester and the free plug, apply a quick squirt of *Servisol 10* to the microswitch and operate it again a few times. Whilst you have the unit open it is worth checking the internal connections to the cable, these are made by small push-on clips and they can become intermittent. The quick cure is simply to solder them to the pin. This applies to the inside of the headset itself too.

Pressel operation

If, when the unit is reassembled you find that the switch needs to be pressed hard to operate, it can be adjusted by opening up the unit again, locate the two screws that hold the microswitch, slacken the nuts on the rear of the fixing plate, then the screws themselves, ease the microswitch so that it is nearer to the button and re-tighten everything.

Conclusion

This little unit has proved invaluable by quickly sorting out good and bad headsets and curing the famously noisy pressel switches. It can also be used to test the telephone type handsets, but of course these need to be dismantled to enable the switch to be rejuvenated.