Mini Bluetooth Adapter for Pskmail without wires - V 1

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AndPskmail for Android at http://www.pskmail.org/AndPskmail.html

1 Motivation:

1.1   As described in the AndPskmail manual (version B0.98-0 onwards), the Bluetooth interface I used until now consisted of a Bluetooth handsfree car kit modified to generate VOX control and proper audio levels for interfacing with the DATA socket at the back of the FT-8x7 units.

1.2   This works well, but I was curious if I could make an even smaller and simpler Bluetooth interface using a headset plugged into the microphone input and using the speaker plug on the FT-817, thereby dramatically reducing the size, weight and complexity of the interfacing since I could then use the VOX function of the microphone input.

1.3   Of course this arrangement can be used with a PC application as well, Fldigi for example and for any digital mode, provided the Bluetooth software on the PC has the Headset profile available. This interface normally appears as a "Bluetooth Audio device" in the list.

2 Concept:

2.1   Using the Android version of Pskmail on a phone or tablet is easier with a Bluetooth interface.

2.2   The key benefits are the absence of RF feedback to the touch screen (what can be better than a few meters of air as an isolator) and a more user friendly set-up with no wires attached between the phone or tablet and the transceiver.

2.3   And since Bluetooth is radio, this feels quite "at home".

2.4   The circuit is very simple, consisting of four resistors and one capacitor.

2.5   Physically, I used the end of a network cable and simply attached the Bluetooth headset at the end of the plug. The arrangement is given mechanical strength with a blob of Polymorph (Polycaprolactone is it's real name) or any other potting solution which encapsulates the 5 components located between the plugs and the headset.

2.6   The headset is a cheap eBay headset at around $10 delivered, but I strongly suspect most version would work as well. In my case the total cost of the project comes to around $13 - $15.

3 Required adaptation:

3.1   Once I opened the Bluetooth headset, I basically de-soldered and removed the microphone and the earpiece speaker. I then extended the wires through where the earpiece speaker was, and closed the unit back.

I then simply wired the five components from the microphone plug and the speaker jack to the headset cables and enclosed the lot in a blob as mentioned above.

3.2   The circuit is shown at the bottom of this document.

4 Results:

4.1   They have been excellent and in fact from a radio to Android device direction, better than the larger car kit unit simply because there does not seem to be any noise reduction function in these little (cheap) headsets. So the signal quality is excellent both ways. I get the receiving Fldigi on the Pskmail server reporting between -36 and -30dB of IMD in the PSK modes which is very good for an on-air test.

4.2   No hash or birdies were detected in my initial tests.

5 Comparison with the Handsfree Car Kit version
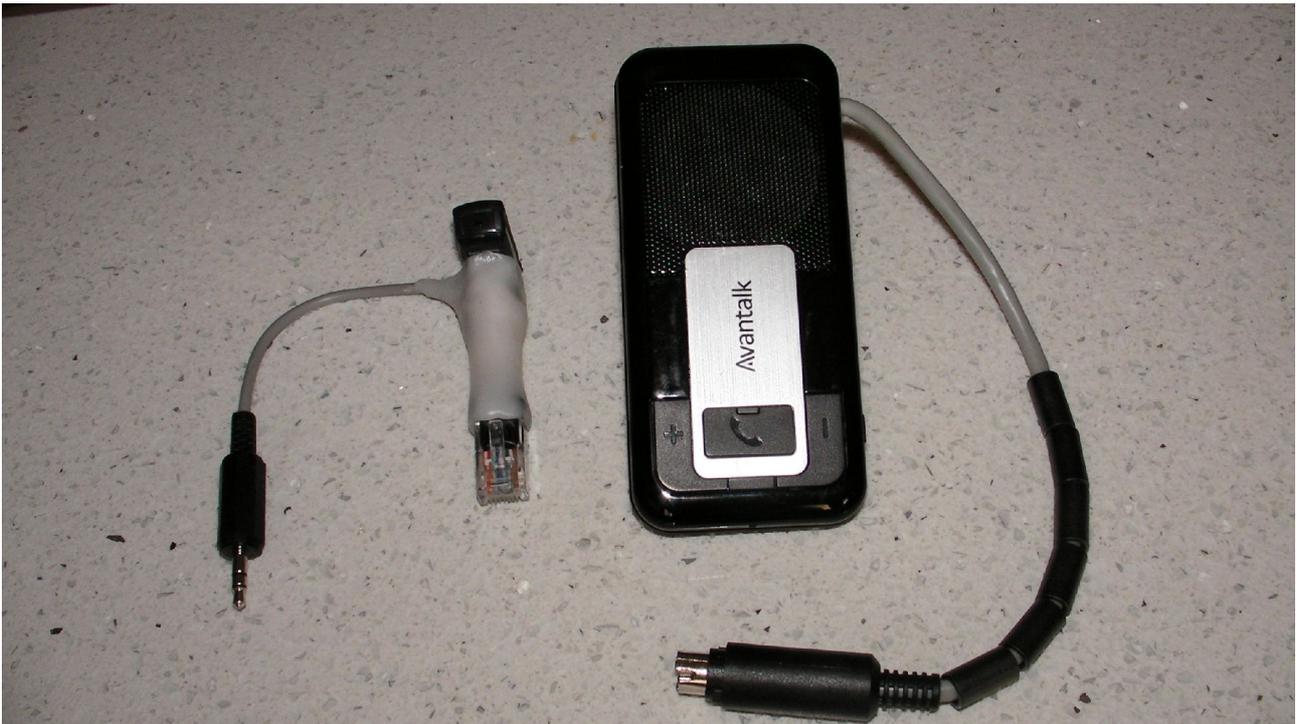
5.1   Advantages and disadvantages of the mini version:
+ Size and weight of course.
+ Simpler circuit (although that NO-VOX circuit connected to the MIC and Speaker plugs can be used with a hands free car kit too).
+ Better audio towards the phone/tablet since there is no noise reduction applied to the signal.
+ Reduced power consumption (not measured but implied due to the size of the batteries and the comparative talk times)
- Reduced "talk time": 3-4Hours versus 10 hours.
- Cannot be charging and connected to the phone over Bluetooth at the same time.
- Cuts the speaker out unless a splitter plug is used.

6 Operation

6.1　　　Only on devices running Android 2.1 (skip this step if you have Android 2.2 and above): download and install the program "testinband.apk" found at Google code.

　　　Link: http://code.google.com/p/android/issues/detail?id=7906　　search for "testinband.apk"

6.1.1　　　Ensure that the modem's volume in the Preferences is at 40 to 60%.

6.1.2　　　Every time you want to use the Bluetooth interface, perform in that sequence:
　　　6.1.2.1　　Ensure Bluetooth is ON, on the phone
　　　6.1.2.2　　Assuming the headset was paired before, start the headset and ensure it is connected (This is typically done automatically upon switching it on).
　　　6.1.2.3　　If you are using Android 2.1, launch the "testinband" application.
　　　6.1.2.4　　Launch AndPskmail
　　　6.1.2.5　　Call the menu in AndPskmail, select "Bluetooth ON"

　　　From now on, the audio received should be from the radio and not the microphone, and the sound output should be redirected towards the transceiver.

　　　To stop redirecting the audio to the Bluetooth and return to the speaker/Audio plug, select "Bluetooth OFF" from the application's menu.

6.1.3　　　Note that the Bluetooth volume needs to be around 50% and above to provide enough signal output voltage to trigger the VOX (dependant on your transceiver's VOX settings Bluetooth headset). Adjusting the volume up and down on the phone should display a "Bluetooth volume" or "In-Call volume" bar on the phone.

6.1.4　　　For devices with Android 2.3 and above, there is automatic disconnection of the Bluetooth device on reception of a phone call. This is to avoid sending the phone's audio over the air. Of course this is only activated when AndPskmail is running AND Bluetooth has been set to ON in the AndPskmail application.

6.1.5　　　As a general note I would recommend for ease of use to have devices with Android 2.3 and above when using a Bluetooth interface as, for this application, the maturity of the Bluetooth implementations in earlier versions are either limited (in 2.1) or buggy (in 2.2).

7 Schematic:

Earpiece speaker Audio OUT from Bluetooth headset (either wire should work since most of these devices have an H output circuit)

Ground (most likely also battery negative)

Microphone Input of Bluetooth headset (try one wire then the other as in some cases it is a balanced input)

R1
1K Ohms

R2
10 Ohms

R3
1K Ohms

R4
10K Ohms

C1
10 nF

To MIC

To MIC GND

MIC
MIC GND
PTT
+5 V
GND
UP
FAST
DOWN

MIC

Microphone plug of FT-817

Speaker JACK of FT-817