BLUETOOTH INTERFACE TO FT-847- CONFIGURATION #1

This document discusses the interface between a BT headset and an FT-847 transceiver for distances up to 10m.

BLUETOOTH WIRELESS CONNECTIONS

There are two methods that can be used.

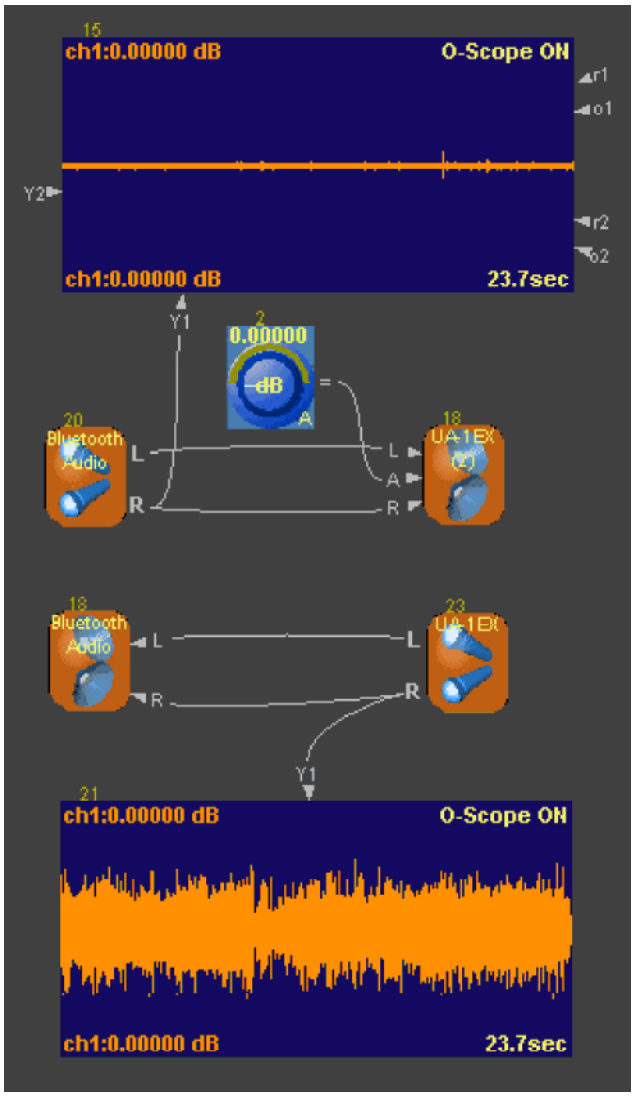
1. ***Hardware*** connection to soundcards - as has been mentioned in the document discussing general interfacing requirements the setup described in that document allows the connection of a ***wired*** headset to the two soundcards used for input and output of audio data to the FT-847. The ***wired*** headset connection can be replaced by a bluetooth ***wireless*** connection using a BT adaptor that is used to add BT capability to a non-BT mobile phone. Such non-BT mobile phones typically have a socket allowing connection of ***wired*** headsets. The BT adaptor (Jabra A210 - ***not the A120s***) has a 2.5mm stereo plug where one 'channel' is the microphone audio and the other 'channel' is the earphone audio. By plugging the A210 into a stereo 2.5mm socket and splitting the 'channels' to the two soundcards we have our replacement of the ***wired*** headset connection by a BT wireless connection via the A210 (which we pair to our BT headset of choice). We have made a connection from the BT headset to the A210 which is plugged into the soundcards which, in turn, makes the connection to the FT-847. As the A210 and the headset are Class 2 devices we can expect a range up to 10m.

   Note that we have bypassed the PC as far as voice data signals are concerned. However, we still have maintained the ability to send/receive SSB data modes via the soundcard USB interfaces to the PC.

2. ***Software*** connection to soundcards - here we use a BTUSB 'dongle' as the connection to the PC. We can use a Class 1USB 'dongle' device to get some increase in range (but ***not*** 100m for reasons discussed in the general interfacing document - about 20 - 25m). The BT 'dongle' looks like a soundcard when run in 'Audio Gateway' mode ('Headset Profile') and can be connected to S/W running on the PC as can any soundcard. However - in order to route the incoming/outgoing audio through the ' dongle' interface to the FT-847 interface soundcards we need a 'bridge'. You cannot simply connect the 'dongle' audio to the FT-847 interface soundcards directly. We need S/W that receives the microphone audio from the BT headset via the 'dongle' and routes it to the output soundcard on the FT-847 interface.

Likewise we need S/W to route the incoming FT-847 audio to the BT 'dongle' and thence to the BT headset earphone. Such S/W is available in the 'Virtual Audio Cable' software package (Google it) and is called 'Audio Repeater'. Another solution is to build a setup in 'AnalogBox' (Google it).

The graphic below is the circuit I use in 'AnalogBox'.



The first method (hardware connection) has the advantage of not needing S/W running to make the connection from BT headset to FT-847 transceiver, but has the disadvantage of being limited to 10m or less range.

The second method (software connection) has the advantage of ***some*** increase in range (about 20 - 25m), but has the disadvantage of requiring S/W to be running to make the connection (in fact, two instances of 'Audio Repeater' are required - one for each audio direction). Also there is a fundamental limitation of the software connection. The incoming BT headset microphone analogue audio is sampled to digital data and then fed through the 'Audio Repeater' S/W

out to the output soundcard where the digital samples are converted back to analogue audio and fed to the FT-847 transmitter (and similarly in the reverse direction for the FT-847 receive audio). The analogue-to-digital conversion and the digital-to-analogue conversion are each controlled by a clock - unfortunately not the same clock. Because of the inevitable mismatch in clock frequencies we will always have a situation where one process or the other has too many or too few samples available and has to pause. This pause causes a click in the audio. One way of preventing this is to provide a buffer between the two processes, but this only postpones the inevitable. Eventually a buffer either over-runs or under-runs. The bigger the buffer the longer the postponement, but also the bigger delay between the sending and receiving of audio (this is called 'latency'). To get rid of the clicks it is necessary to stop and then restart the audio streams in the 'Audio Repeater' S/W every 5 minutes or so typically for a buffer length of about a second. A setup in 'AnalogBox' seems less prone to clicks, although they are still there. In any case on the low bands it is difficult to distinguish the clicks from the clicks and pops on the normal receive audio. However, on-air tests have shown that it is quite noticeable on the transmit audio.

SPECIAL NOTES:

1. Neither of the above methods provide for PTT control at the headset - there needs to be a separate ***wired*** PTT line to control the transition from receive to transmit. So we are still tied to the transceiver.

2. Both configurations use the BT headset as the source of transmit audio. Because of the DSP processing employed in the typical BT headsets (to reduce background noise from the microphone which is remote from the mouth a couple of centimetres in front of the ear), the audio has a 'processed' characteristic that is noticeable on air. A BT headset with a boom microphone might improve this as the level of DSP processing can be much less.

NEXT CONFIGURATION

The next configuration that will be described combines increased range (tested to about 50m) and remote PTT switching as well as a either a boom microphone headset or a BT headset. This will be detailed in a document referenced as 'Configuration #2'.