Improving the SignaLink USB for ROS reception

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The characteristics of the signal and noise spectrum delivered to your PC will be influenced by the combination of your receiver performance, the interface and the soundcard in use. Jose Alberto, EA5HVK, informed me the optimum performance would be achieved with a flat frequency response of at least 500 Hz to 2500 Hz.

Like many other operators I chose to use a SignaLink USB interface when I purchased a new FT-450D because it was a neat and functional replacement of my homebrew interfaces I had used for BPSK and it was equipped with its own built–in soundcard. It also provided isolation in the TX and RX directions in the event of RF feedback into the PC and the build state was excellent.

The migration to ROS was simple with nothing to change except the software, but reception was not always optimum.

A minor improvement was seen by making a direct connection from the radio speaker output to the PC soundcard input, but Jose Alberto stressed that it would be better to take the receiver output from the rear DATA port.

Since the SignaLink USB was already connected to the DATA port I tried connecting the SPKR output of the SignaLink USB to the PC soundcard, so avoiding the SignaLink built -in soundcard. Again this worked, but was still not optimum.

So I monitored the noise spectrum at the PC using several waterfalls. I found the most revealing results from Fldigi, because they include colour contrast indicating amplitude.

The DATA fed through the SignaLink SPKR port was suffering a bandwidth problem.

On examination of the SignaLink PCB by shining a torch through the board it was obvious that the SPKR and AUX ports of the device were still connected to the soundcard input circuit through an isolation transformer and it was probably this transformer that was causing a bandwidth problem.
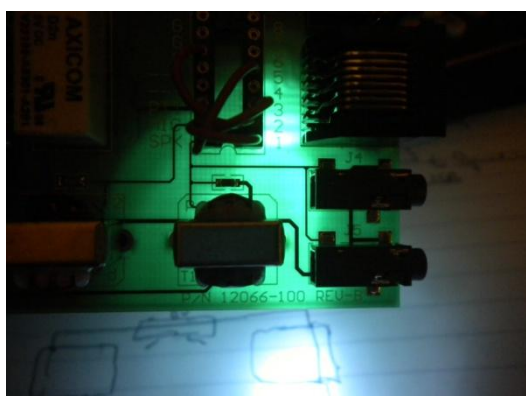
By cutting the PCB track it was simple to disconnect the SPKR port from the AUX port and the input stage of the soundcard, leaving it free to be connected directly to the DATA line via the RJ-45 connector internal wiring. The PCB is conveniently provided with a mini patch panel. So (taking one of the SignaLink provided patch links) Pin 5 of the RJ-45 can be connected to the SPKR port.

This solution allows the SignaLink USB to be used with its own soundcard in TX mode and with the PC soundcard in RX mode. The SignaLink USB can easily be changed back to use its built-in soundcard for both modes by removing the patch panel link from the SPKR port and fitting a link from Pin 5 to SPK on the mini patch panel. The only thing lost is the connection to the SPKR socket on the back of the SignaLink USB, but this was identical to the AUX socket which is still connected to the soundcard and can be used as an alternative.

This provides a neat and tidy way of splitting the RX and TX paths from the radio DATA port, but offers no RF isolation in the RX mode, so before making any changes try the direct connection to the radio speaker or phone output first. Make sure the radio operates without RFI problems at the PC due to the lack of isolation in the RX path.
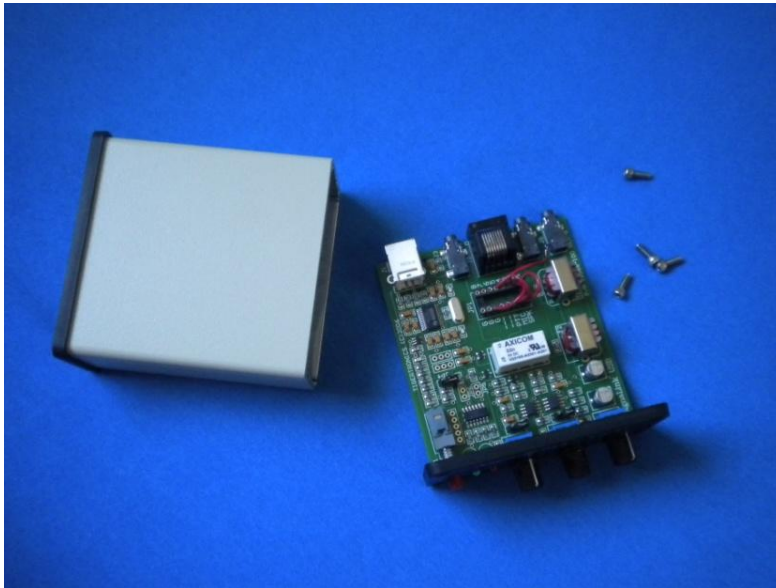
Making the changes to SignaLink USB

What you need

- Strong and sharp blade
- Small soldering iron
- Thin solder
- Spare patch link (provided with SignaLink USB)
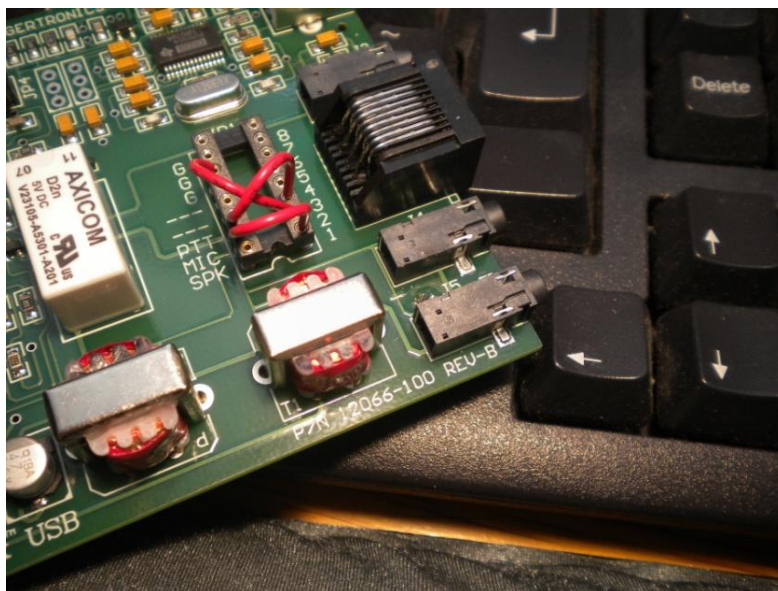- Audio lead with 3.5mm plugs each end
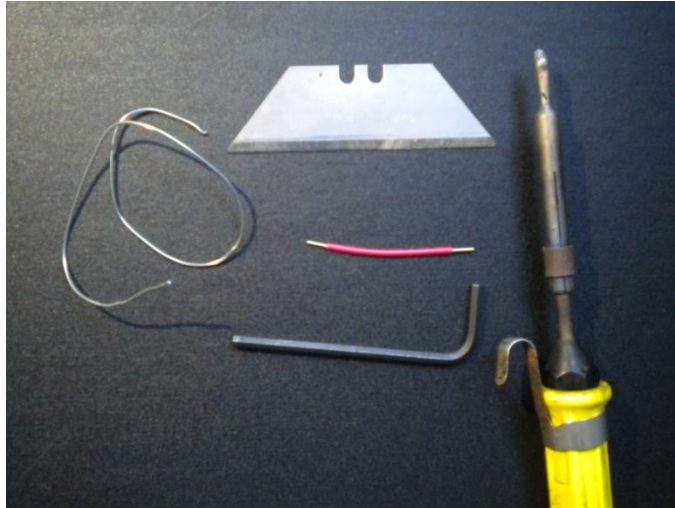
Step 1

- **Remove the 4 screws at the front of the SignaLink USB using the Allen key provided with it.**
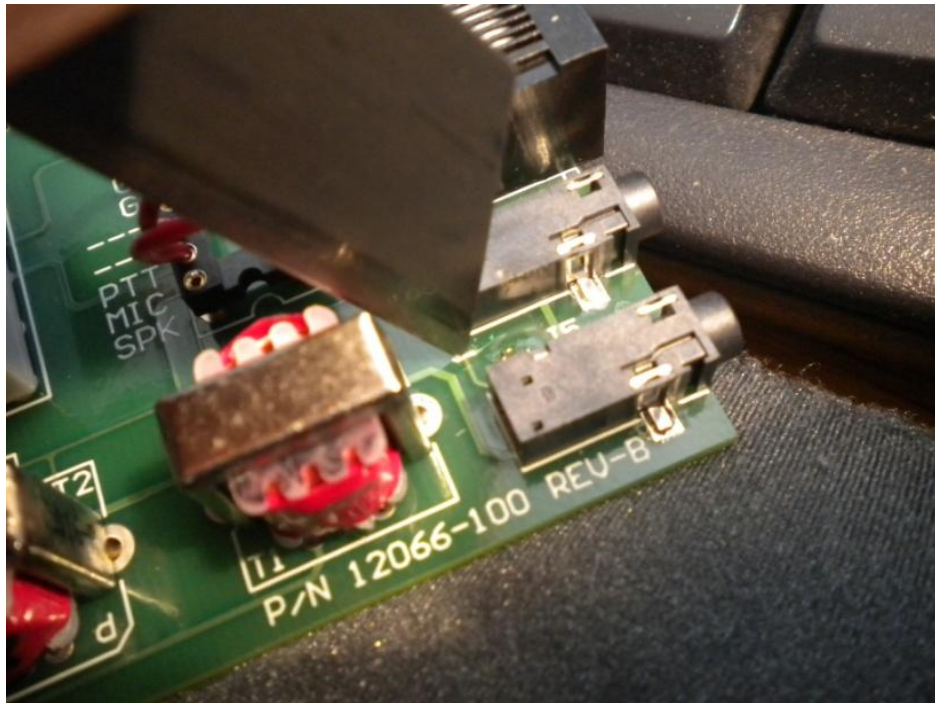- **Pull the PCB and front panel forward and out of its metal casing.**

- **Remove the patch panel link from SPK to 5.**

**This view also shows the cut in the PCB track (see step 2)**

Step 2

- **Using a sharp blade, scalpel or craft knife carefully position it on the PCB track so a cut can be made in the position shown. Widen the cut so the break in the track can be clearly seen. Blow away any debris.**

Step 3

- Using a fine tipped soldering iron and fine solder carefully tin the rear tag of the SPKR connector on the PCB. Tin one end of a wire link and bend the end at about 90 degrees. Fit the other end of the wire link into pin 5 of the mini patch panel. Then fold the wire down to meet the SPKR terminal and solder in place. It may be helpful to use a small screwdriver to hold the wire in place while it is soldered.
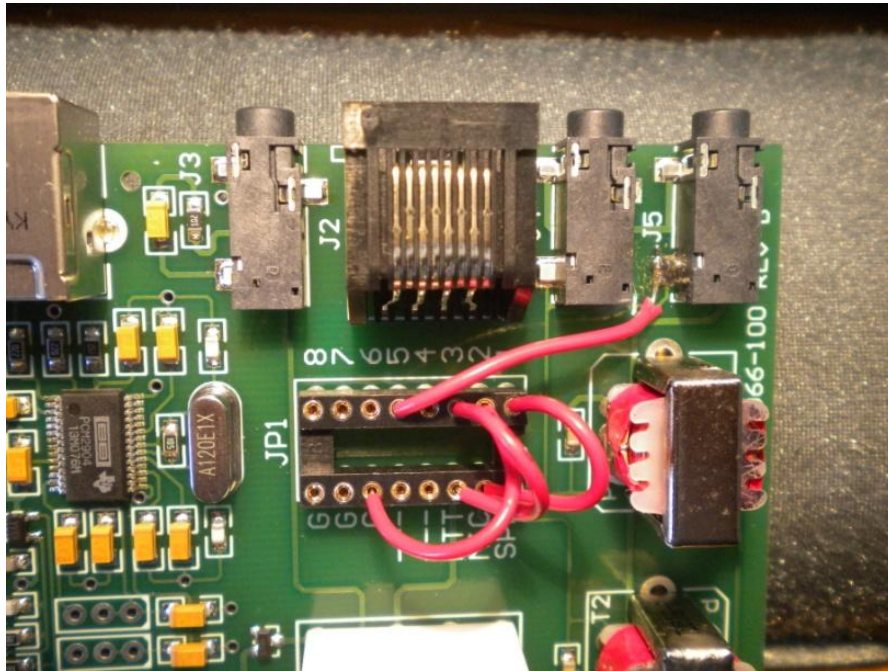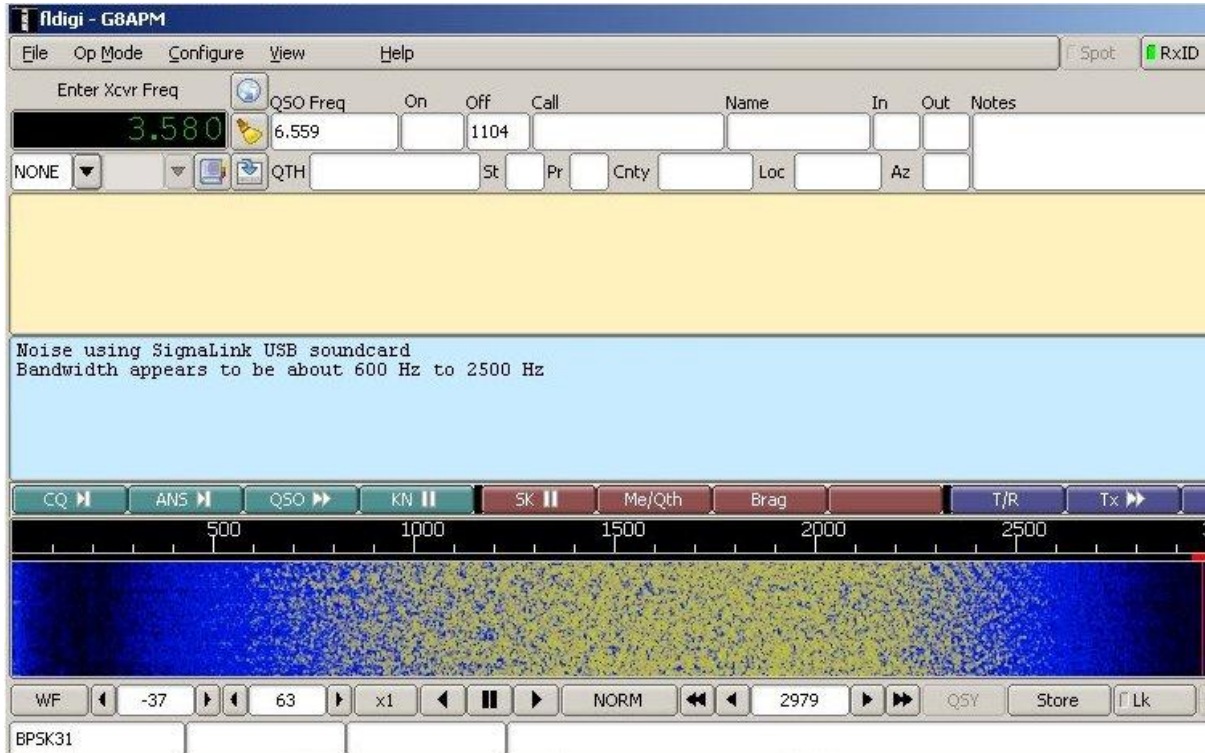

Step 4

- Replace the PCB and front panel assembly into the metal casing and fit the 4 screws.
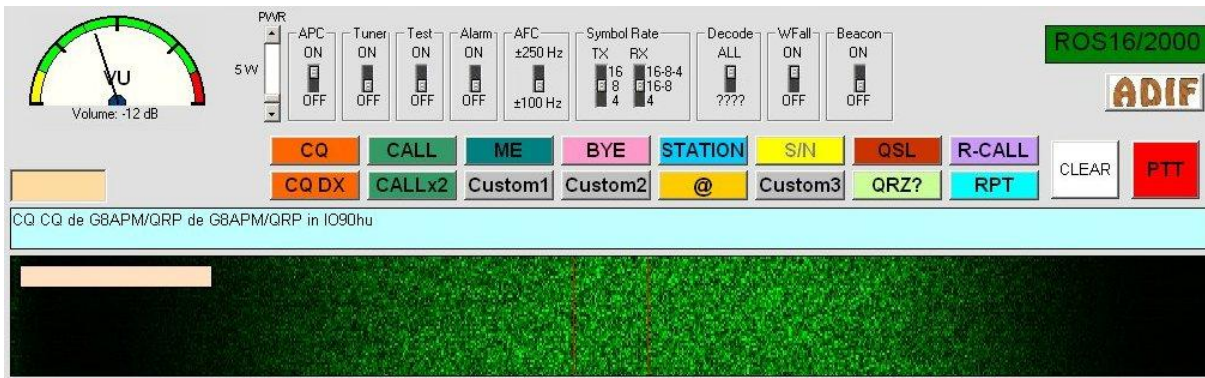
Step 5

- It's all done. Connect it all up. Don't forget to re-configure your soundcards in the ROS software so RX is using the PC soundcard and TX is using the SignaLink USB soundcard.
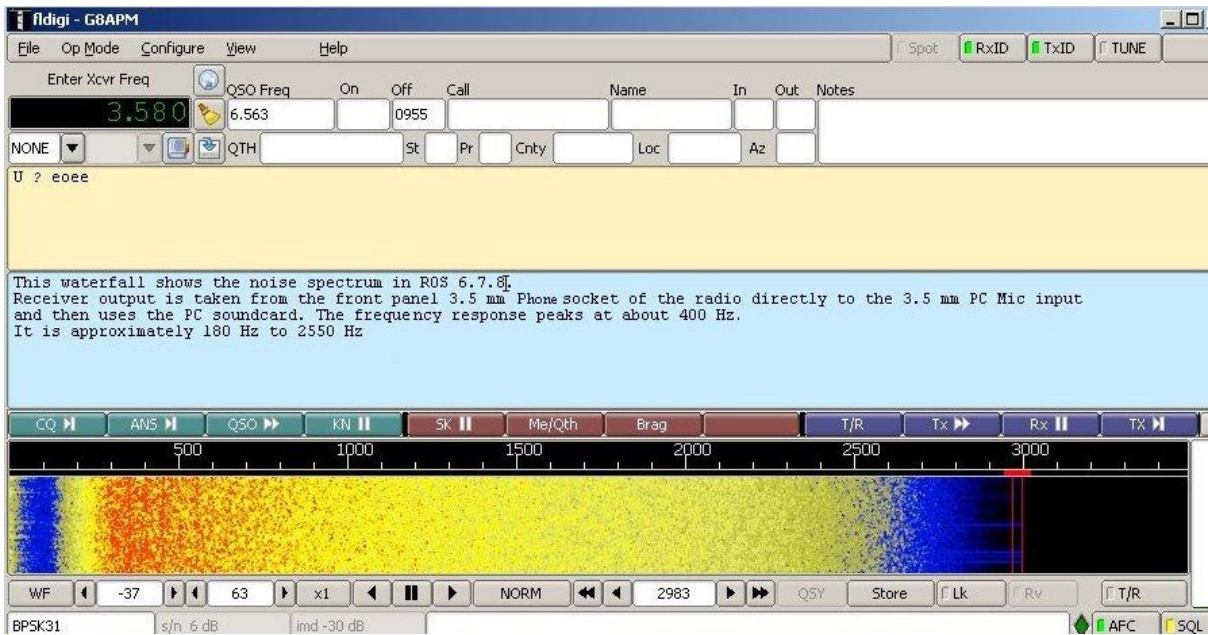
The results

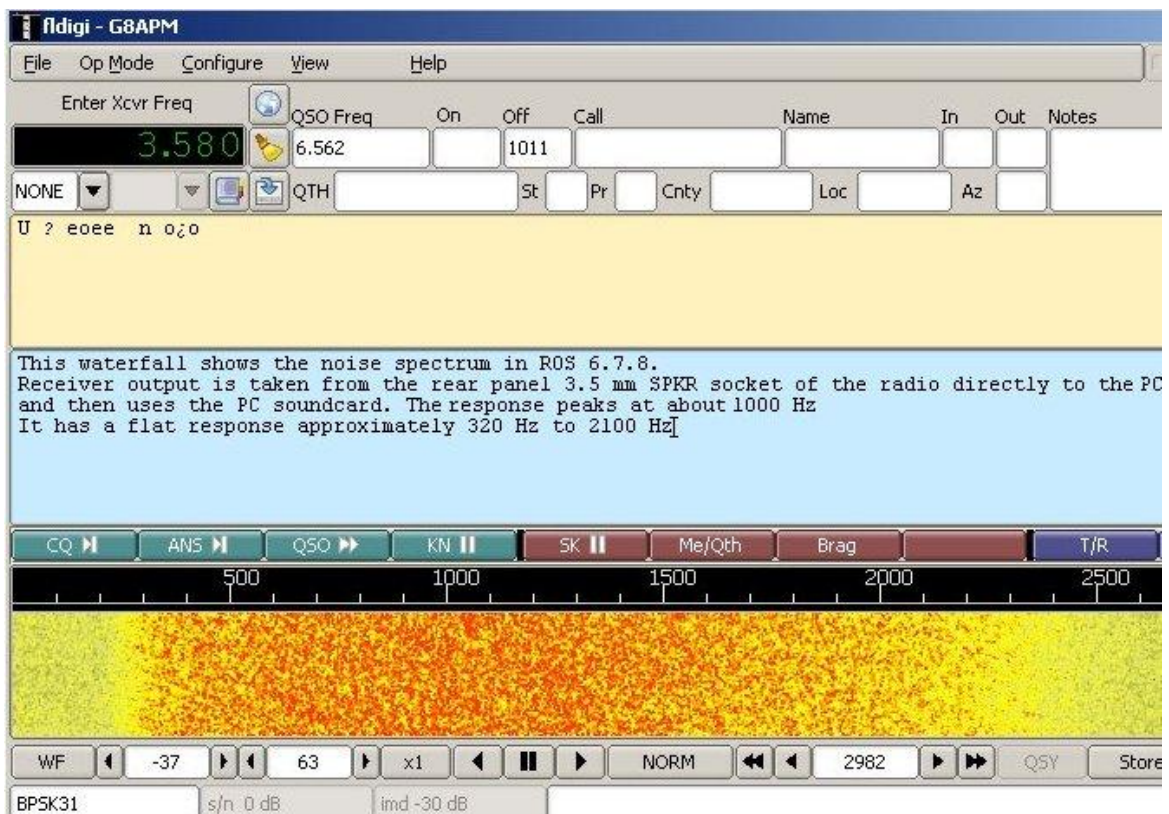## Using the SignaLink USB soundcard for RX signal

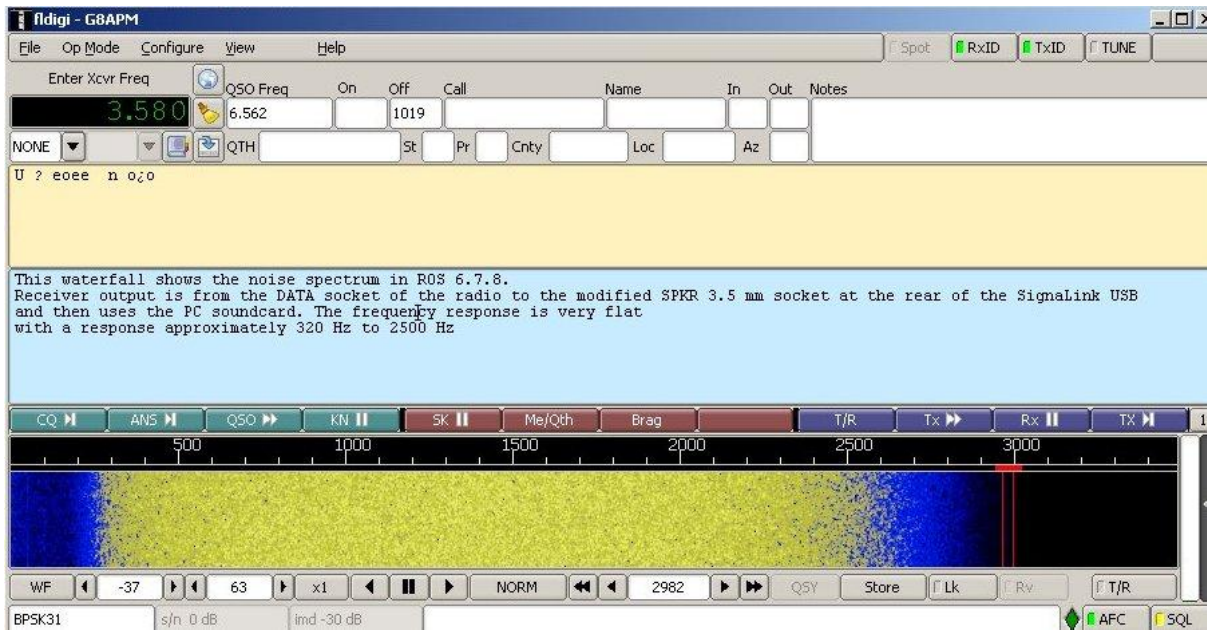### And the corresponding ROS waterfall

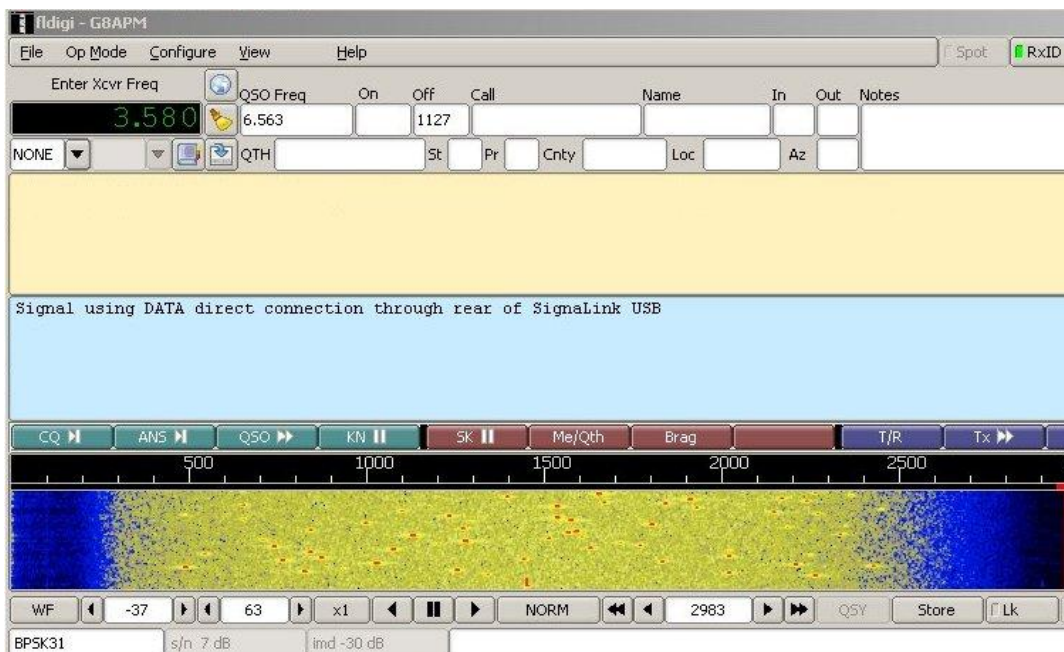## Using the front panel phone socket direct to the PC soundcard

Using the radio rear EXT SPKR socket direct to the PC soundcard

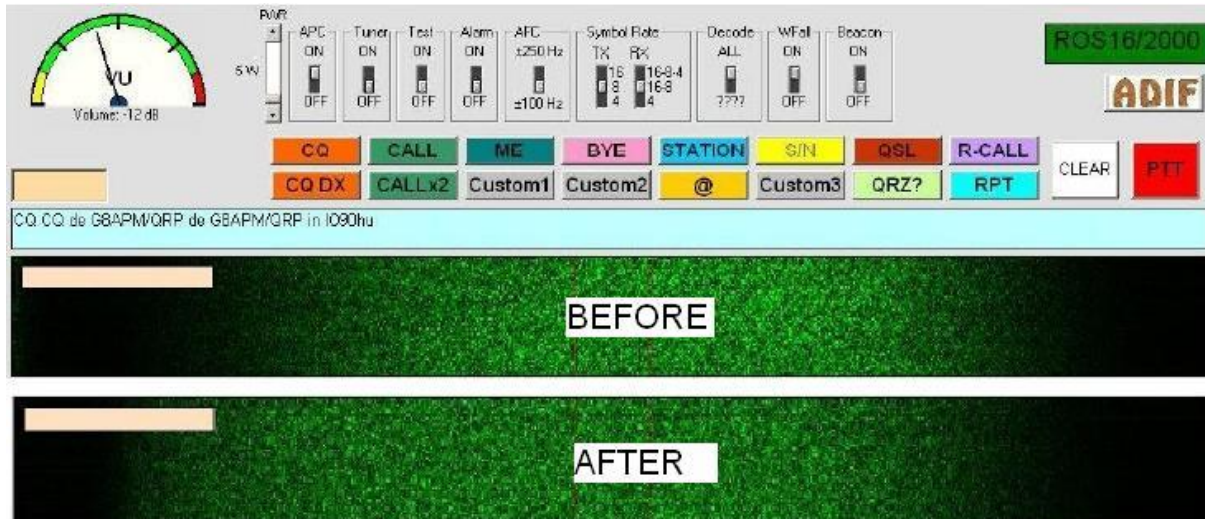## Using the DATA socket via the modified SignaLink USB to the PCsoundcard

Incoming low level signal from DATA port via modified SignaLink USB

Below is a comparison of the ROS spectrum before and after showing clearly the improved LF performance.

If you have a better receiver than mine the high frequency response may be extended.

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