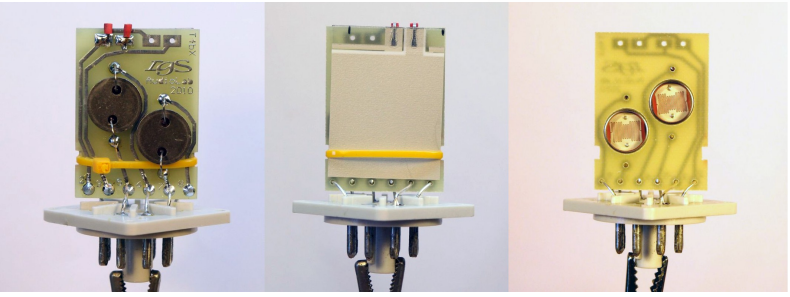
T4Bx photocell

Learn how "The sound" is created!

Written by Igor Sobczyk

It is widely known that the LA-2A unique character is a result of the applied T4B photocell. In the original TELETRONIX design a electroluminescent panel provided a light source for the photo resistors. This component was very variable in parameters, and this affected the result compression and stereo image of the audio.

In IGS Audio we developed a new photocell parallel to the T4BX. By precisely selecting, testing and pairing subcomponents used in the assembly of this photocell we have product line consisting of nearly identical devices in parameters and sound.



Recently I had an opportunity to gather together a few T4B photocells used in the legendary TELETRONIX LA2A. Basing on the IGS 2LA replica I compared the T4B opto-cuplers. The T4B photocell is the single most important element responsible for the compressor's sound. Every T4B circuit is composed of an electroluminescent panel (EL panel) and 2 photoresistors. One of them reduces gain and the other influences the meter. The setting for the compressor are: GAIN 60, PEAK REDUCTION 100.

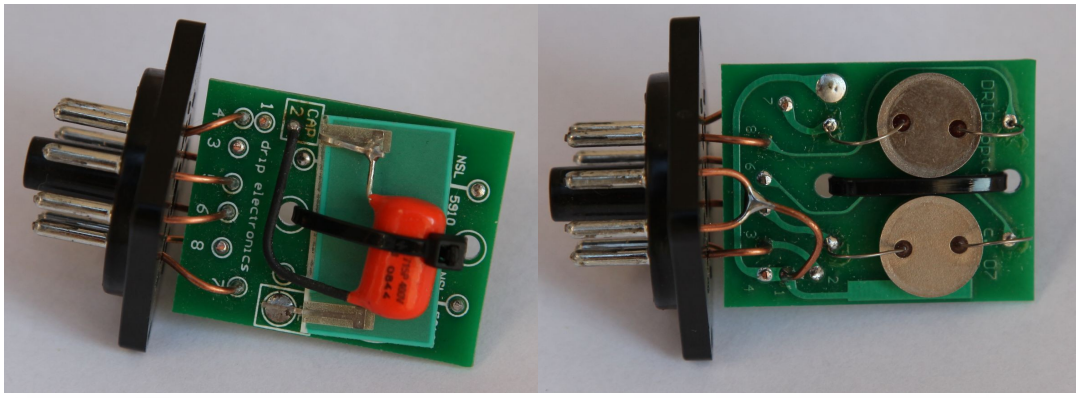
The tests were commenced with removing the covers and looking carefully what's inside the particular photocells. Each cell is built slightly different.

1. IGS Audio.

No-name EL panel and Silonex NSL5910 photoresistors.

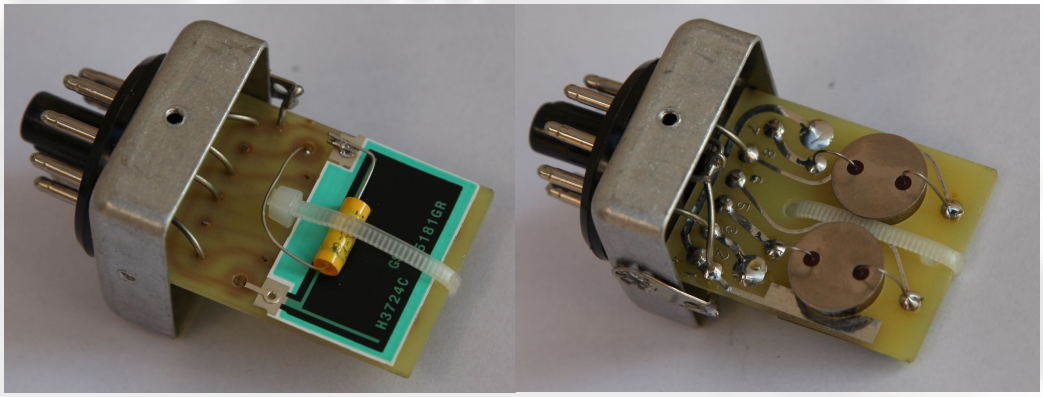
2. Drip Electronic.

No-name electroluminescent panel without and Silonex NSL5910 photoresistors. 47nF/400V capacitor series connected with the panel.



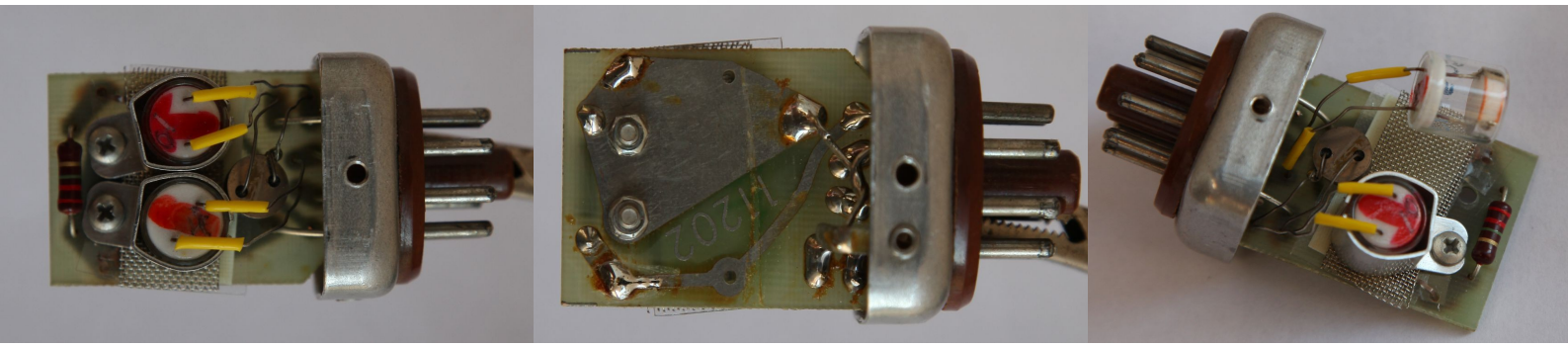
3. Universal Audio.

H3724C, 95181GR, GSI Electroluminescent panel. Silonex NSL-02-042 0310 photoresistors. 4,7nF/100V capacitor series with the panel. There is more than 100V in this place(!)



4. UREI.

No-name EL panel, CL-505L photoresistors, 11202 type printed circuit. The electroluminescent panel is covered with a silver plated brass wire net with a 0,25mm2 stitch. One of the photoresistors responsible for compression level has a parallel connection to CL-705HL 332 photoresistor. On the input of the panel a 2M2 resistor is parallel connected to the ground.



The T4B opto-coupler has key influence in forming the output signal of the LA2A compressor.

By carefully selecting the required photocell you can shape the compression, attack and release levels.

The Drip El. Photocell has the lowest compression level and practically desn't work for 1kHz frequency. The additional capacitor cutting off part of the band decreases the reaction for the lowest frequencies. So no compression on bass sounds. This is typical, but only for compressors used on sum compression. It is known as Sidechain. This photocell can be used for guitar compression, but the compression level is very low.

The Universal Audio photocell has a much higher compression level and good attack and release times. The device sound good immediately. The average attack and release settings (about 1s.) give an interesting spectrum of using this photocell.

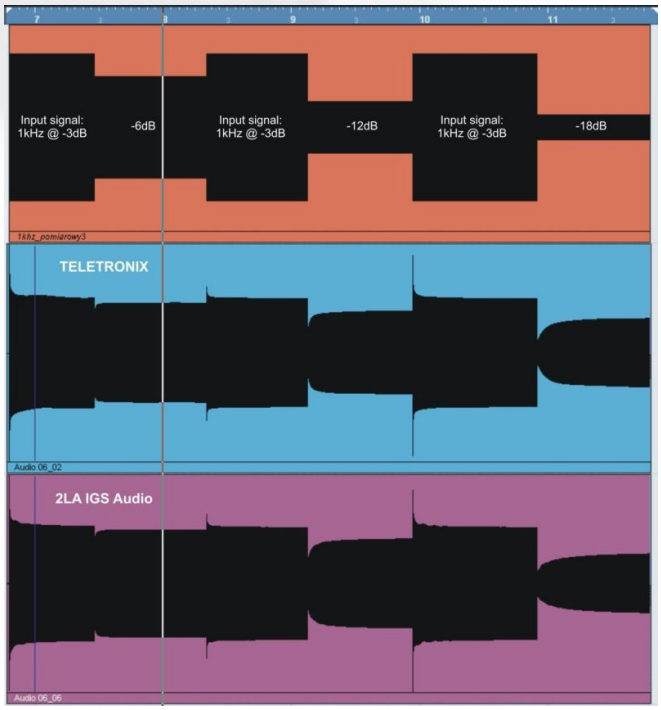
The UREI photocell has a compression level similar to the UA one. Still, at first glance you can notice the very short attack and especially release times. This could be a result of two things. First of all, the wire net may diffuse the signal and momentarily accumulate heat energy later released. This occurs in very short time cycles corresponding to the time of attack and release of the compressor. Secondly, the second parallel connected photoresistor to the gain reduction circuit has its effect. Parallel connecting two photoresistors can result in interesting circuit time constants.

The IGS Audio T4BX photocell has the highest level of compression. Practically, a high input signal is squashed into an even rectangle. Fast attack and release times give add an extra edge to the sound. Additionally, all of the sound profiles of the previously tested photocells can be achieved by simply setting the gain reduction. I'd like to remind you all that these tests were performed at maximum gain reduction(100) of the compressor. This compressor sounds great for vocals, guitars, bass and drums.

More tests.

This time I managed to get a hold of the oryginal UA Teletronix LA-2A and as well as the IGS Audio 2LA. The UA device is equipped with the Teletronix photocell while the IGS 2LA with the T4bX.

Just as before I generated the 1 kHz signal with volume changes. This signal gives us some idea how this device will work in transient states. A transient state is a short amount of time during which the device functions in an unpredictable way.



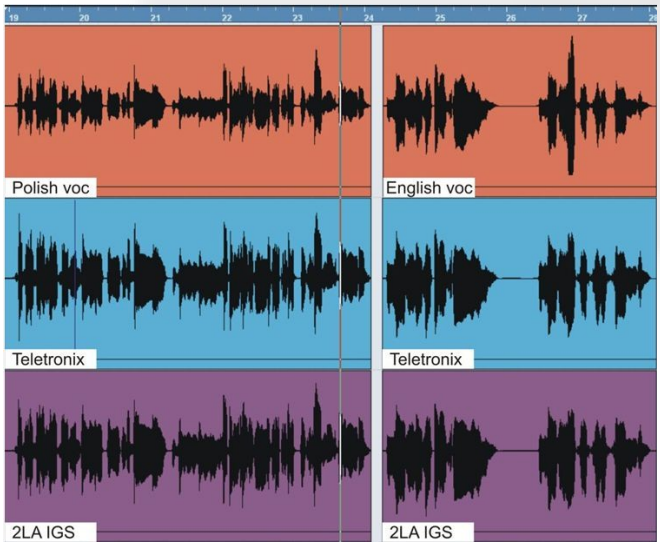
The example shows a slightly longer release time for the IGS 2LA.

This time I started with audio samples. The devices are well known to me so I don't even look inside. The Urei is a classic and the other one I built myself so I have some idea :)

Rear views.

For the sake of repetitiveness I used one set of wires as well as sound processor inputs and outputs. I switched wires positions during the test.

I began the test by calibrating the devices – there were minor differences. The UA was set o 40/40 while the IGS to 50/50. A slight adjustment was made to compensate the output volume. Next I chose two prerecorded vocal tracks. One in Polish and one in English. The samples can be downloaded below.



Uncompressed and compressed files view.

The red color files are the oryginals. The blue color files are processed through the Teletronix and the purple color files through the IGS 2LA. As you can clearly see, peaks now nicely controlled. The signal is louder, as that is the role of compressor on vocals. These compressed signals are easier to mix.

Polish sample sung by Gutek, and the English sample by Losza Vera. Thanks guys for the test material..

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