

Analysis of HP 5086-7271 Microwave Power Amplifier

Matthias, DD1US, February 18th 2018

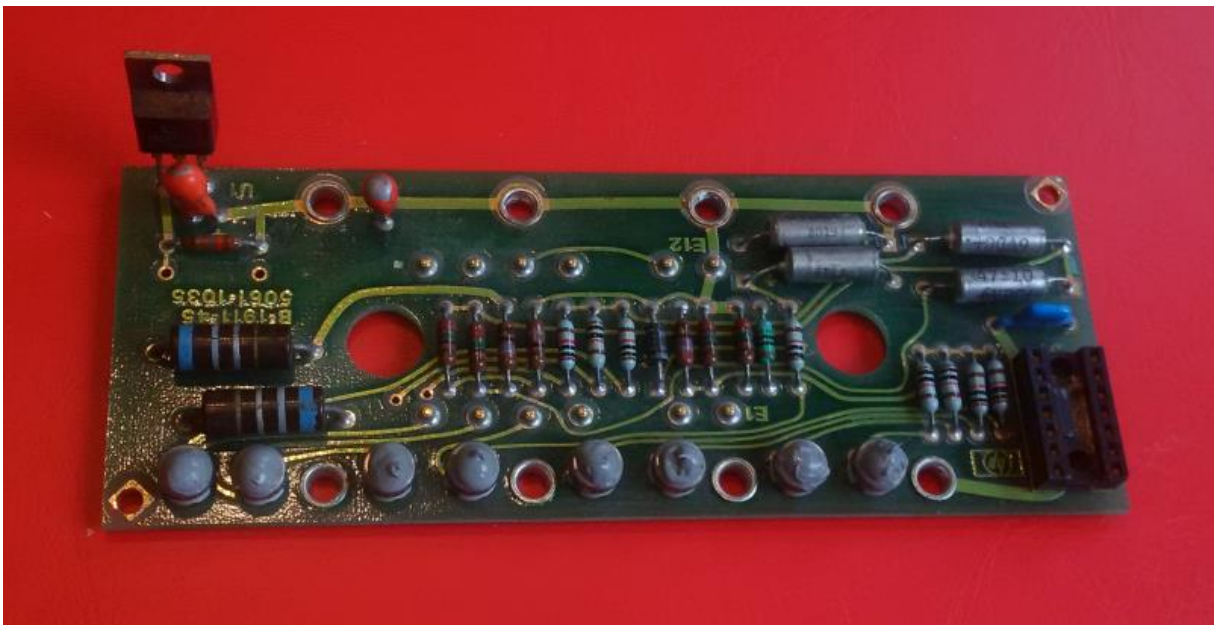
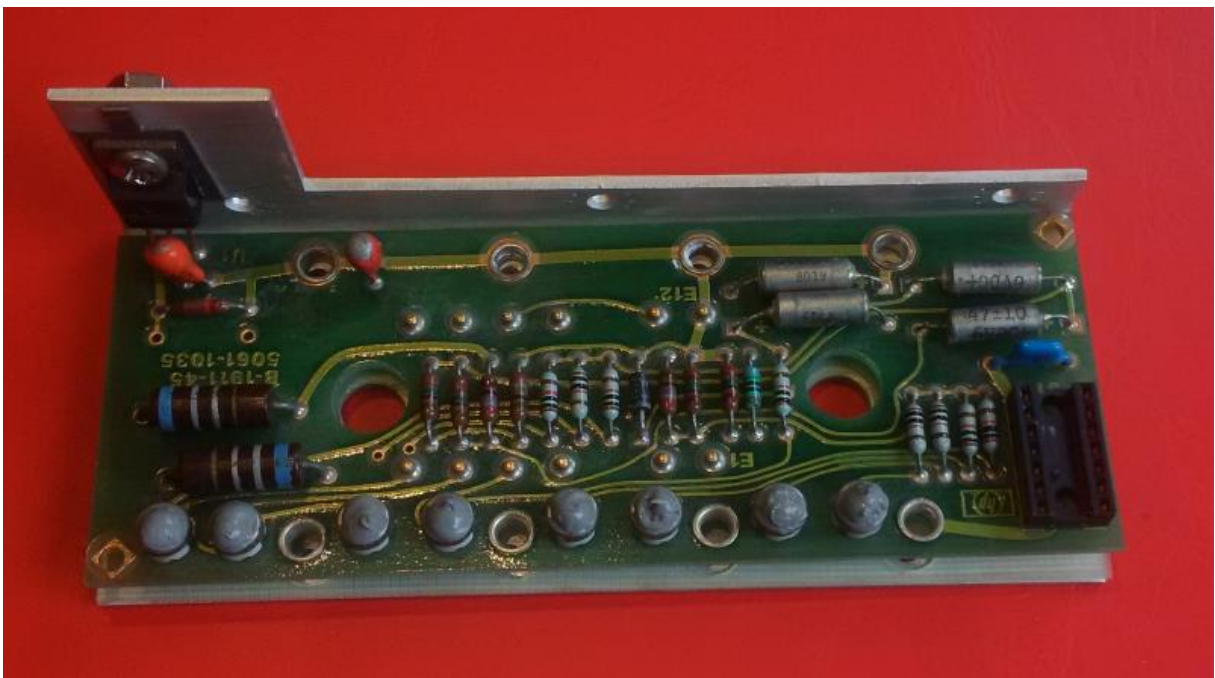
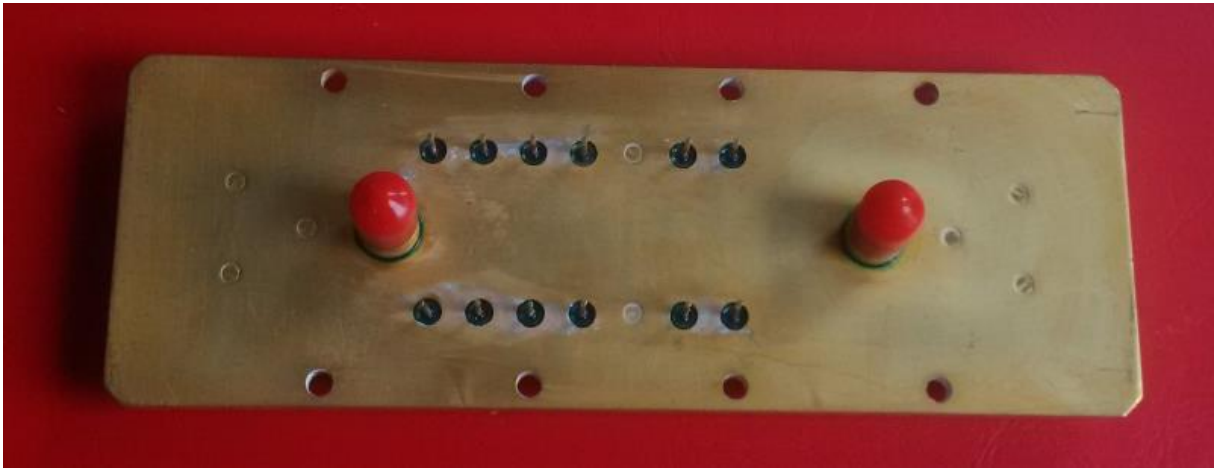
Hello,

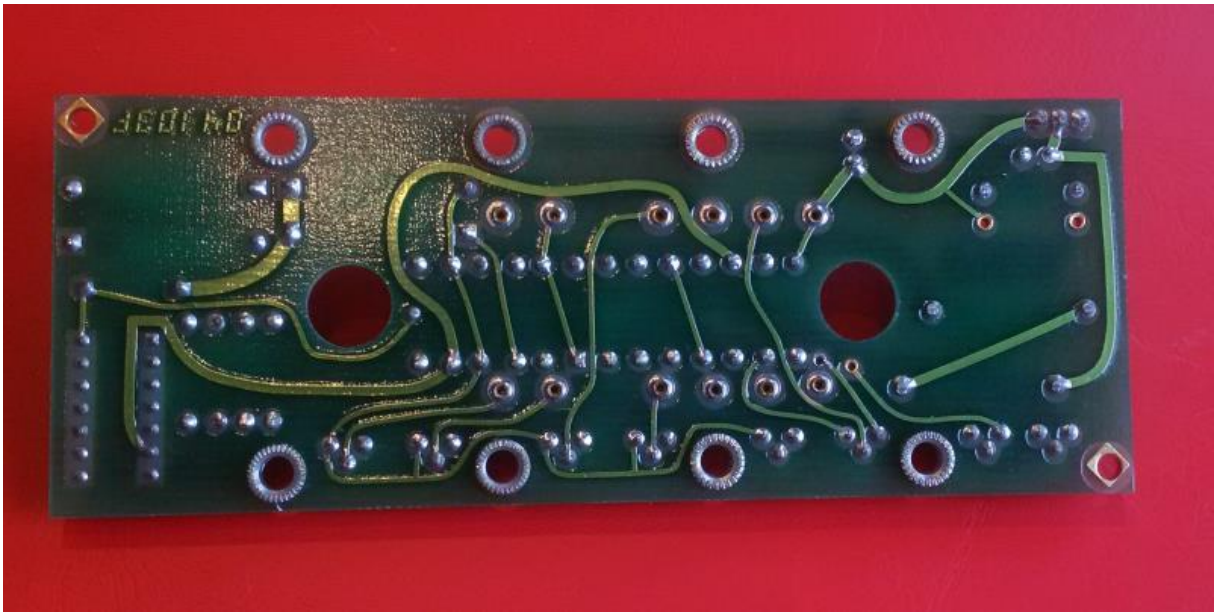
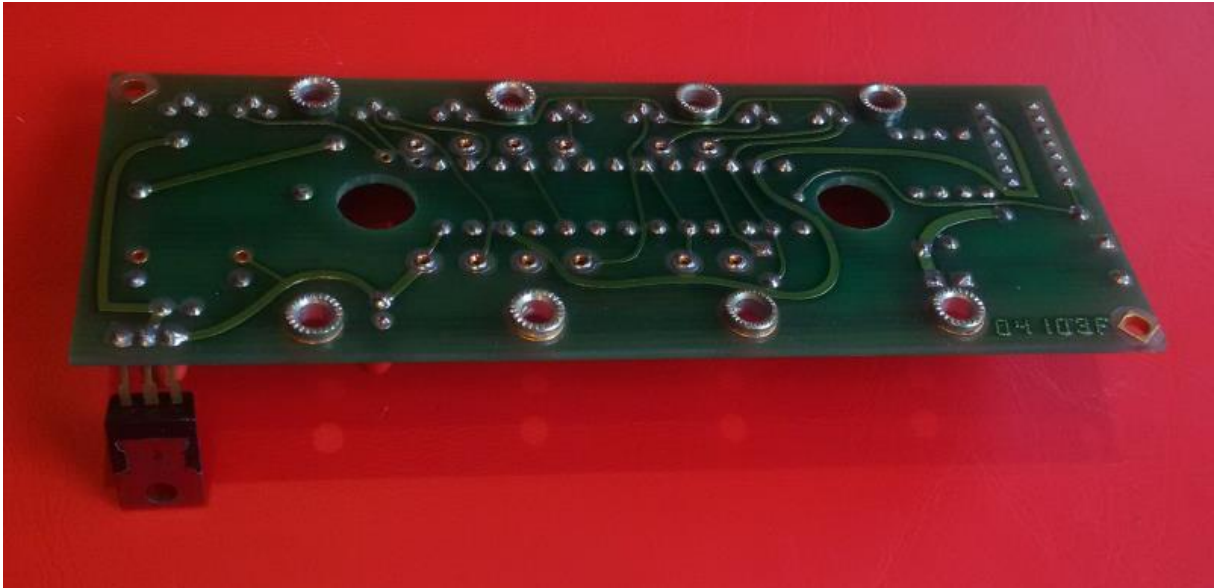
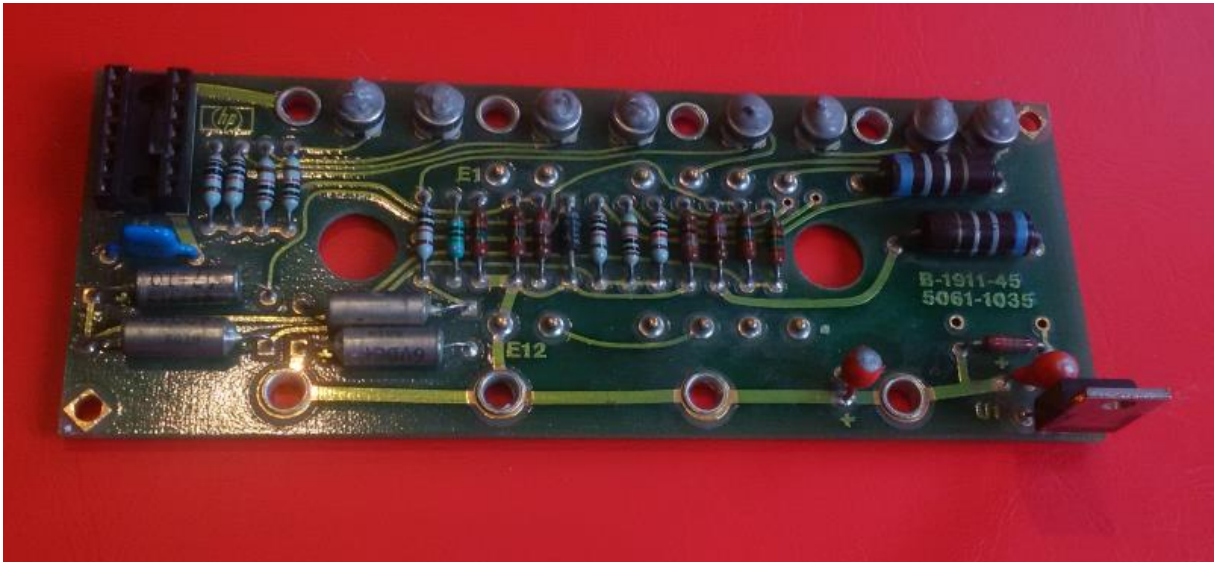
looking for a suitable amplifier to boost and equalize the output signal of the low-band output of an ADF5355 synthesizer I decided to give the HP 5086-7271 amplifier a try. Such modules can be found second hand in the Internet for very low prices. There seem to be an identical device available under the part number HP 08672-67004.

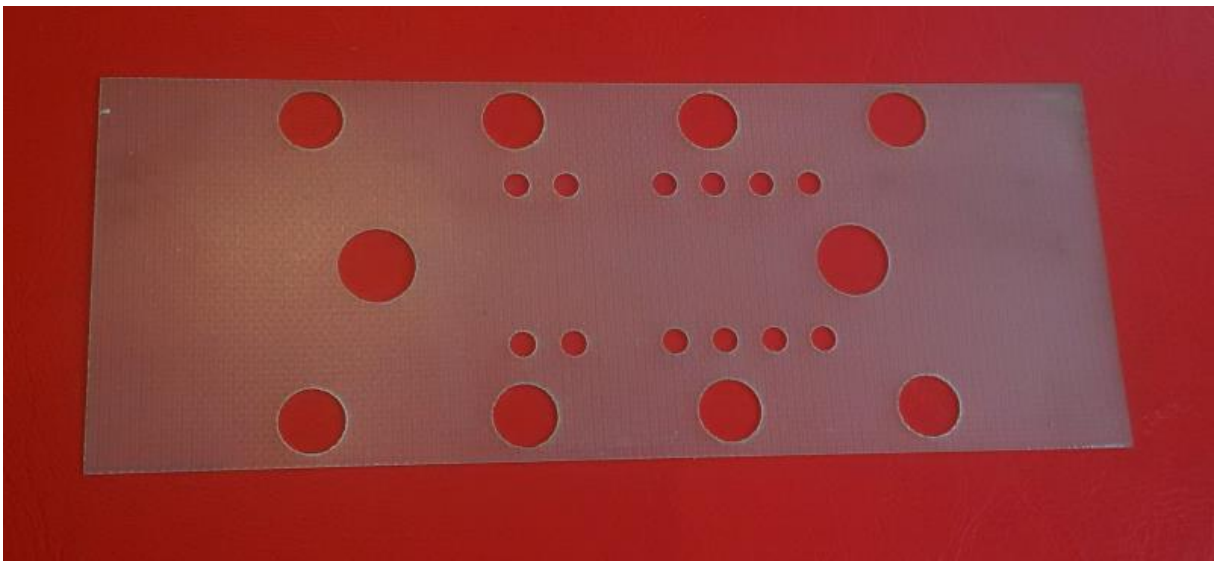
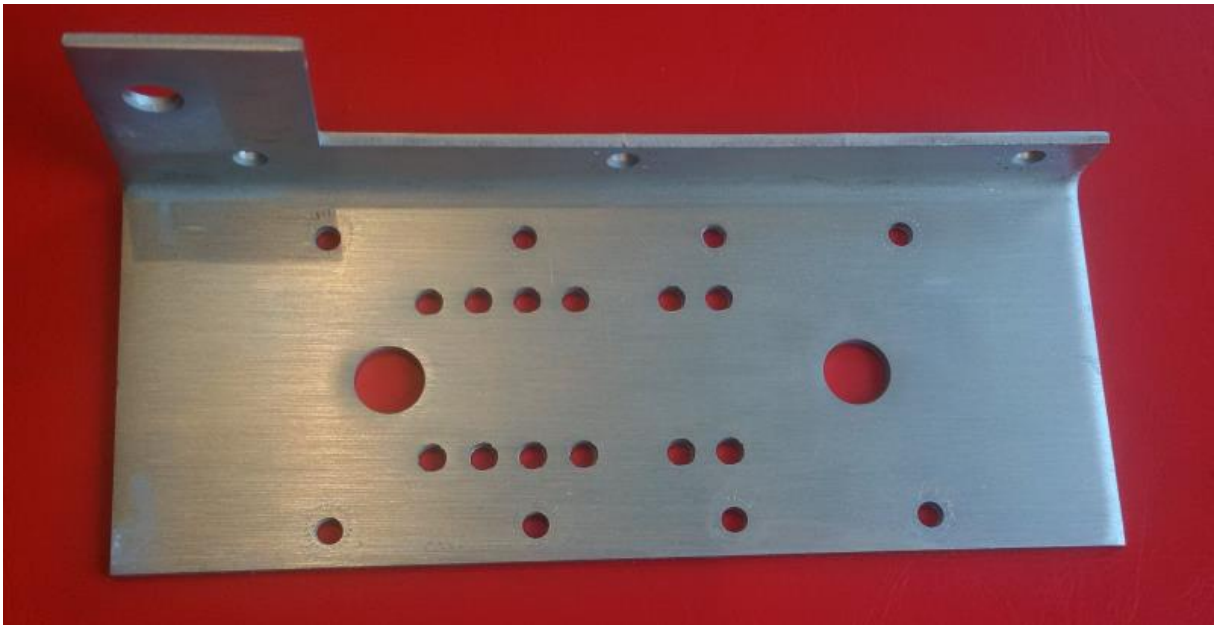
Other than the frequency range 2.0-6.2 GHz, there is no information online available and even the sellers do not provide any information such as data or just the necessary supply voltages. Thus, I bought such a surplus module and after cleaning it carefully I also extracted the schematic. The seller claimed that it was used in a HP 86290B plugin for a sweeping signal generator.

Here are pictures of my module.

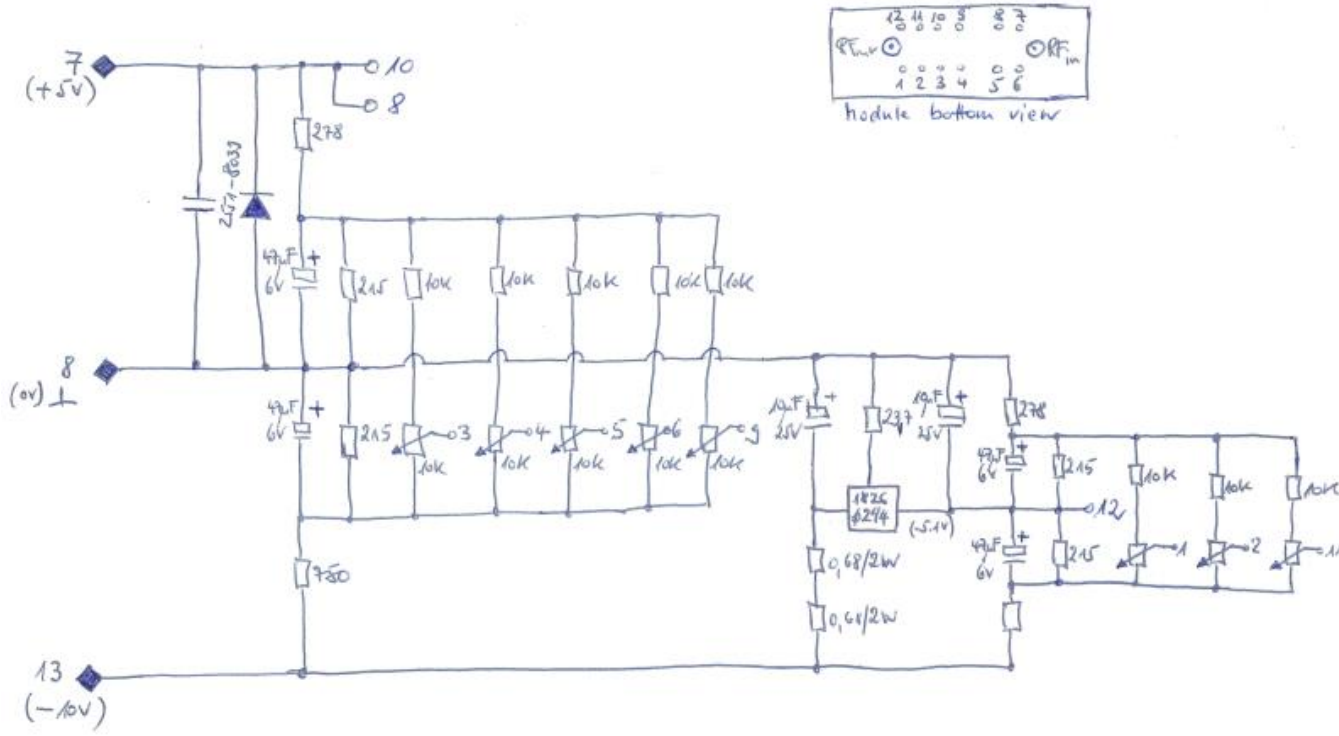
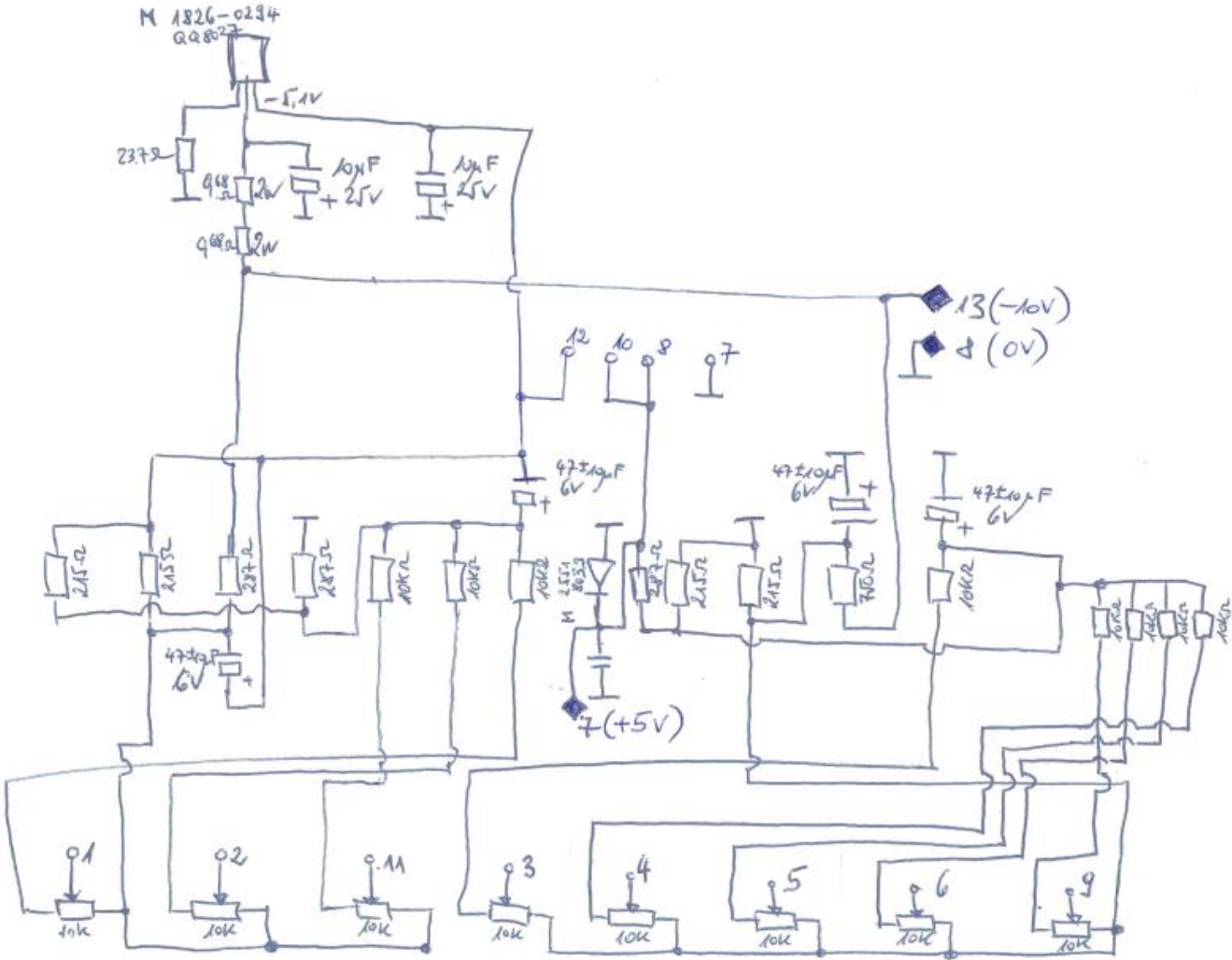








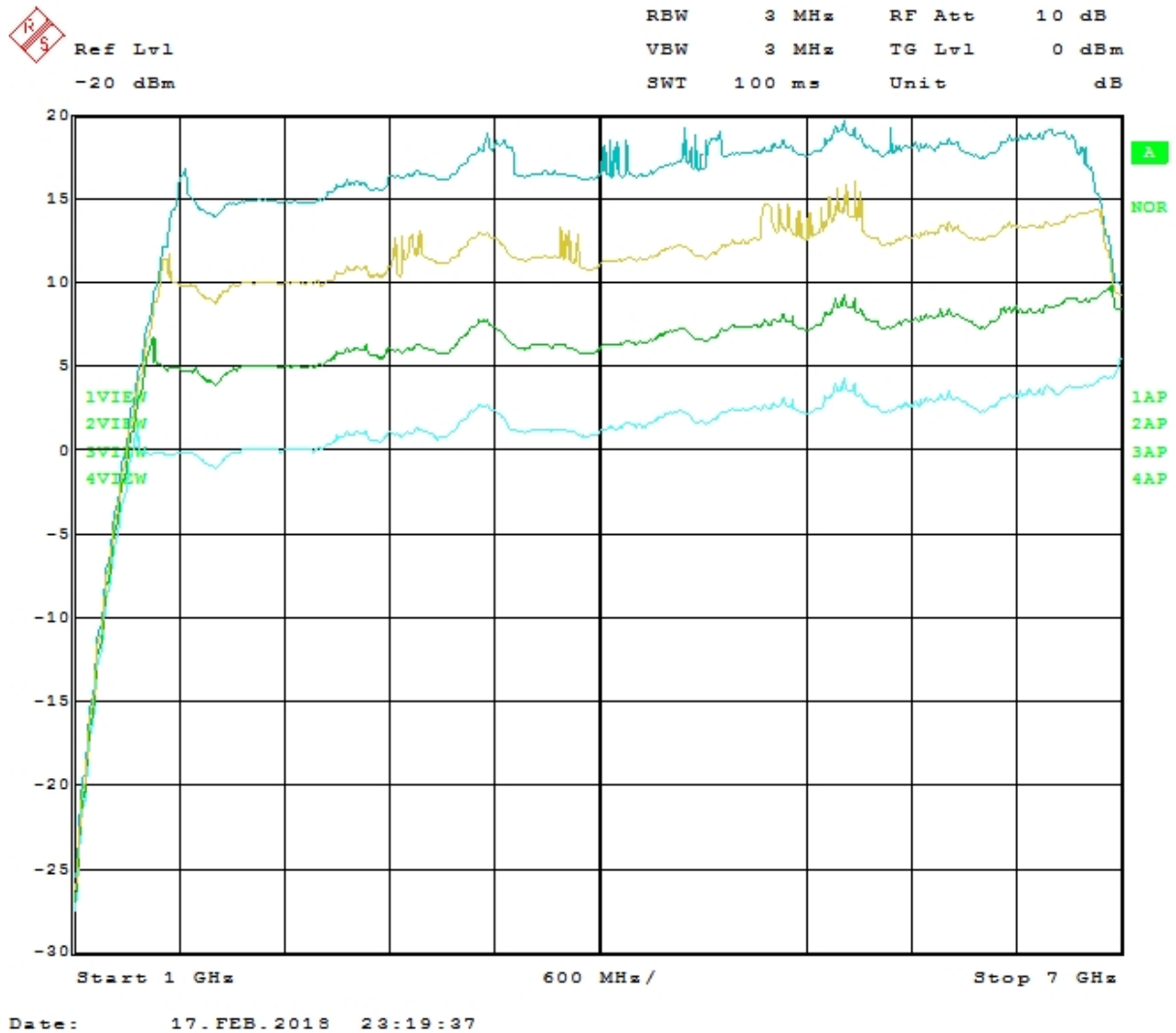
Next, I analyzed the control board and extracted the schematic which you can find below. I made 2 sketches: a first which is similar to the layout of the board and a second one, which makes the function of the board easier to understand.



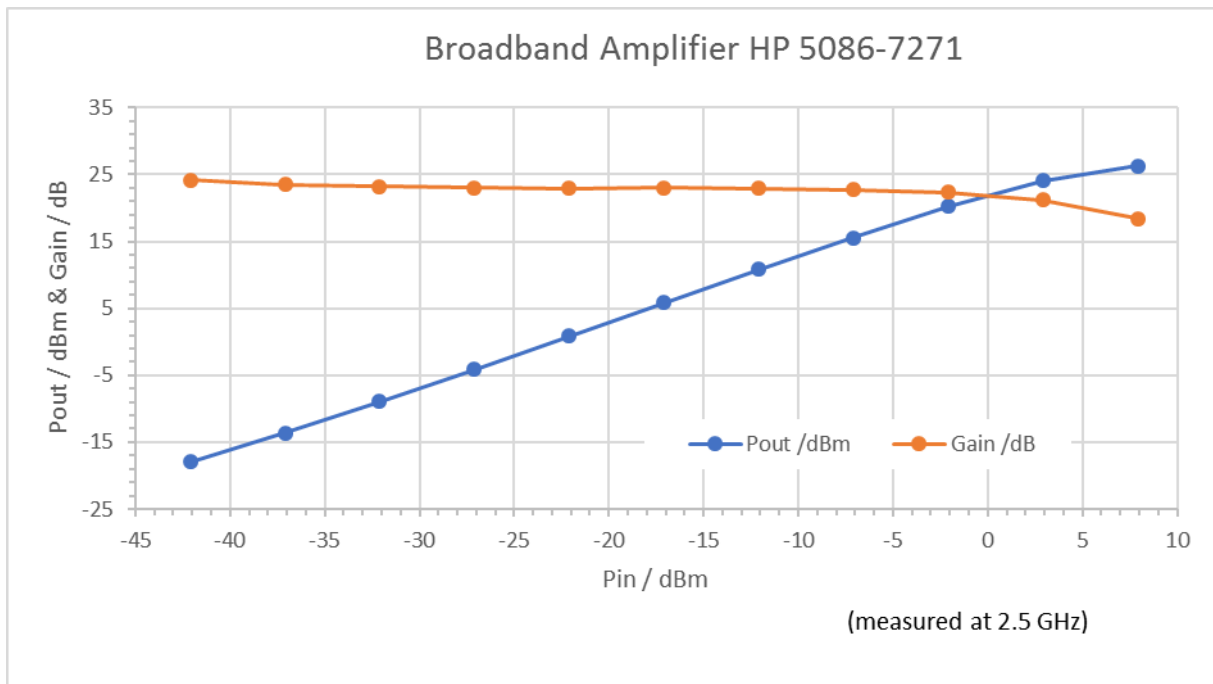
There are a number of trimmers which are apparently used to adjust the biasing of the amplifier module.

Based on the schematic I estimated the supply voltages to be +5V and -10V. The supply voltage can be inserted at the 14-pin IC-socket on Pins 7 (+5V), 8 (GND) and 13 (-10V). Testing the module with such supply voltages resulted in the subsequent results. The current consumption is 500mA from the -10V supply rail and 320mA from the +5V supply rail.

The first graph shows frequency sweeps from 1GHz to 7GHz. The input power for the 4 traces was -20dBm, -15dBm, -10dBm and -5dBm. The frequency response is reasonably flat between 1.7GHz and 6.8GHz. Thus, it fits the low band output of ADF5355 synthesizer which covers up to 6.8GHz very well. I will need to investigate some more where the narrowband ripple is originated.



The next graph shows a power sweep at 2500MHz. As can be seen the maximum output power is +26 dBm at an input power of +8dBm. The small signal gain of the amplifier is approx. 23dB.



I plan to add a ALC loop based on a directional coupler and diode detector at the output of the amplifier which will drive a pin-diode attenuator at its input. Thus, I hope to get a constant output power versus frequency before adding a switchable broadband attenuator to generator precise power levels.

Please send me further information about such modules. I always appreciate feedback. Please send it to the Email address which you can find below. Many thanks in advance.

Best regards

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