Condition Module (Unica3)
Test and calibration procedure

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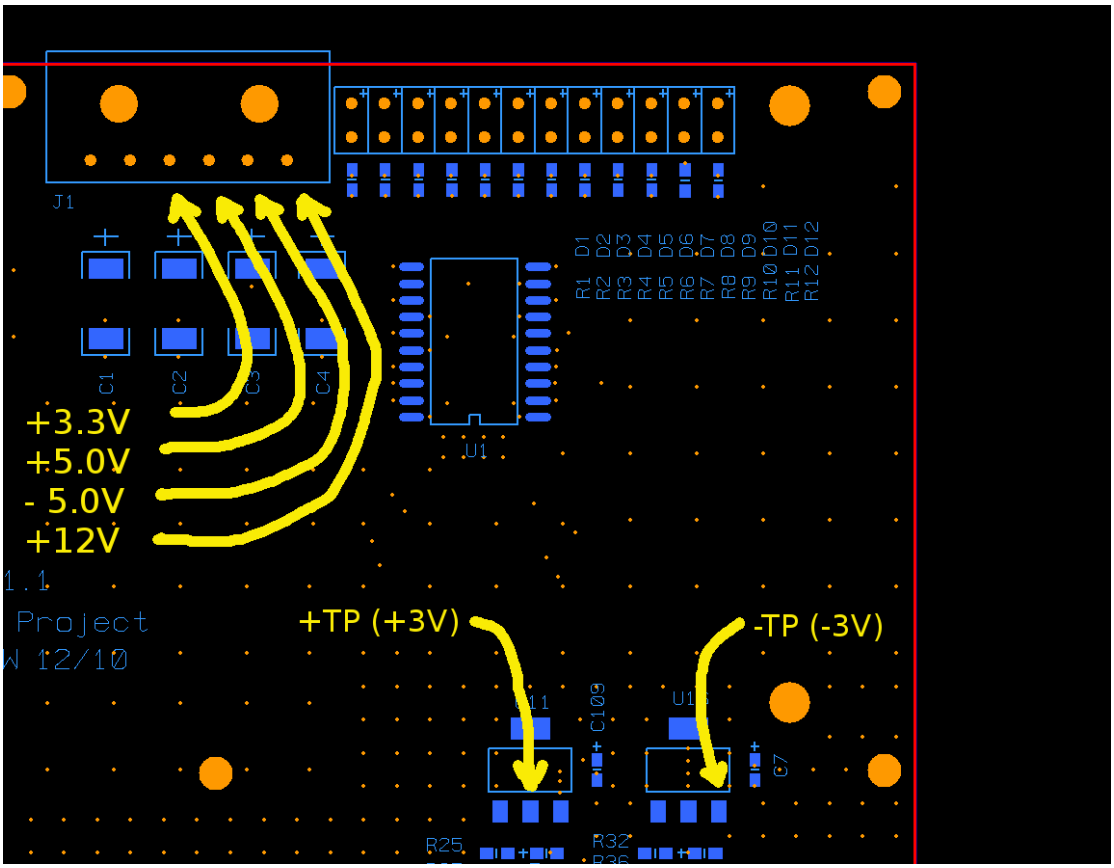
Last modification: 12Apr2013

Power supplies:

Check board for short circuits in the supply voltages. There is no solder mask and therefore backside components may have moved during the soldering process.

Connect power cable only. Check for the supply voltages on the power connectors. Check the on-board regulated voltages for the TP part. These should be +/- 3.0 V with a tolerance of +/- 0.1 V.



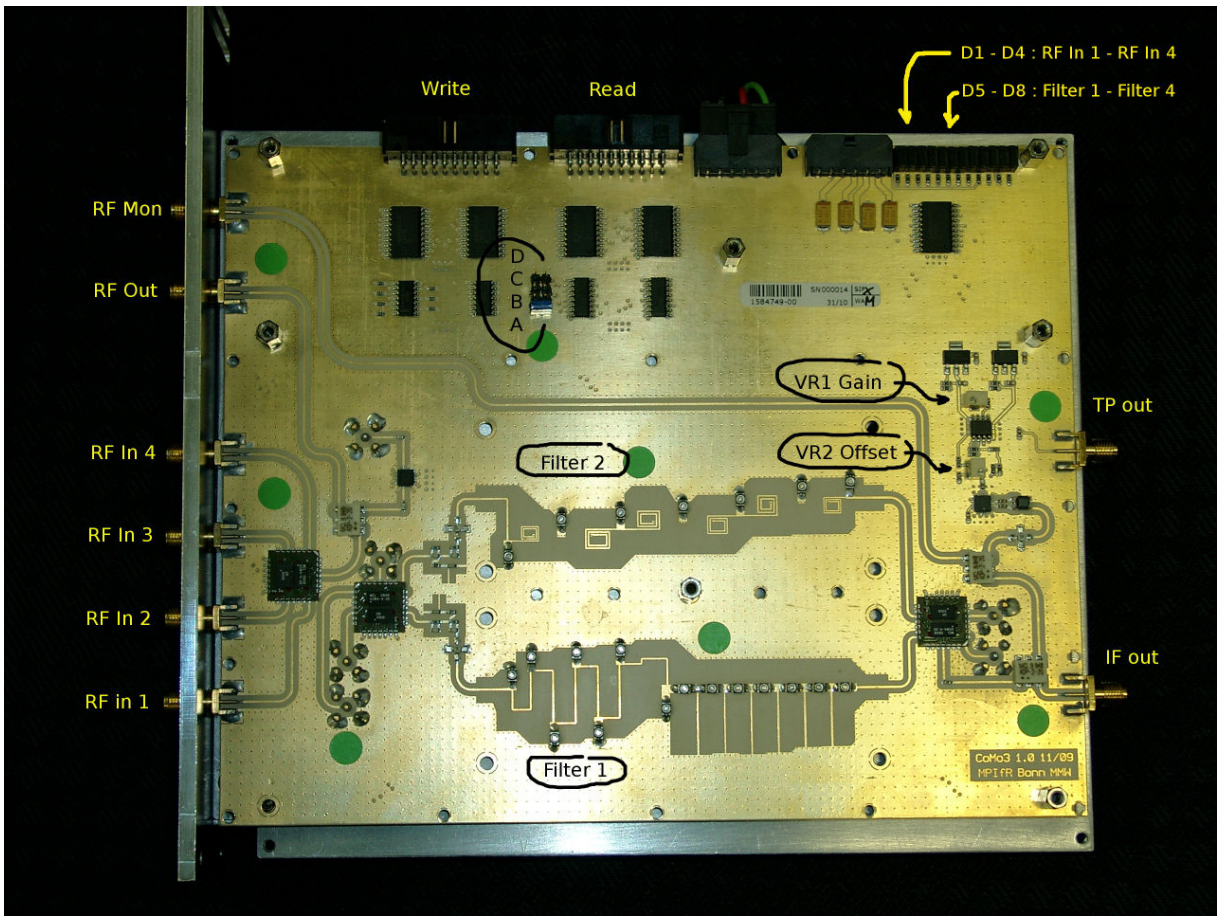
Read / Write / Address decode:

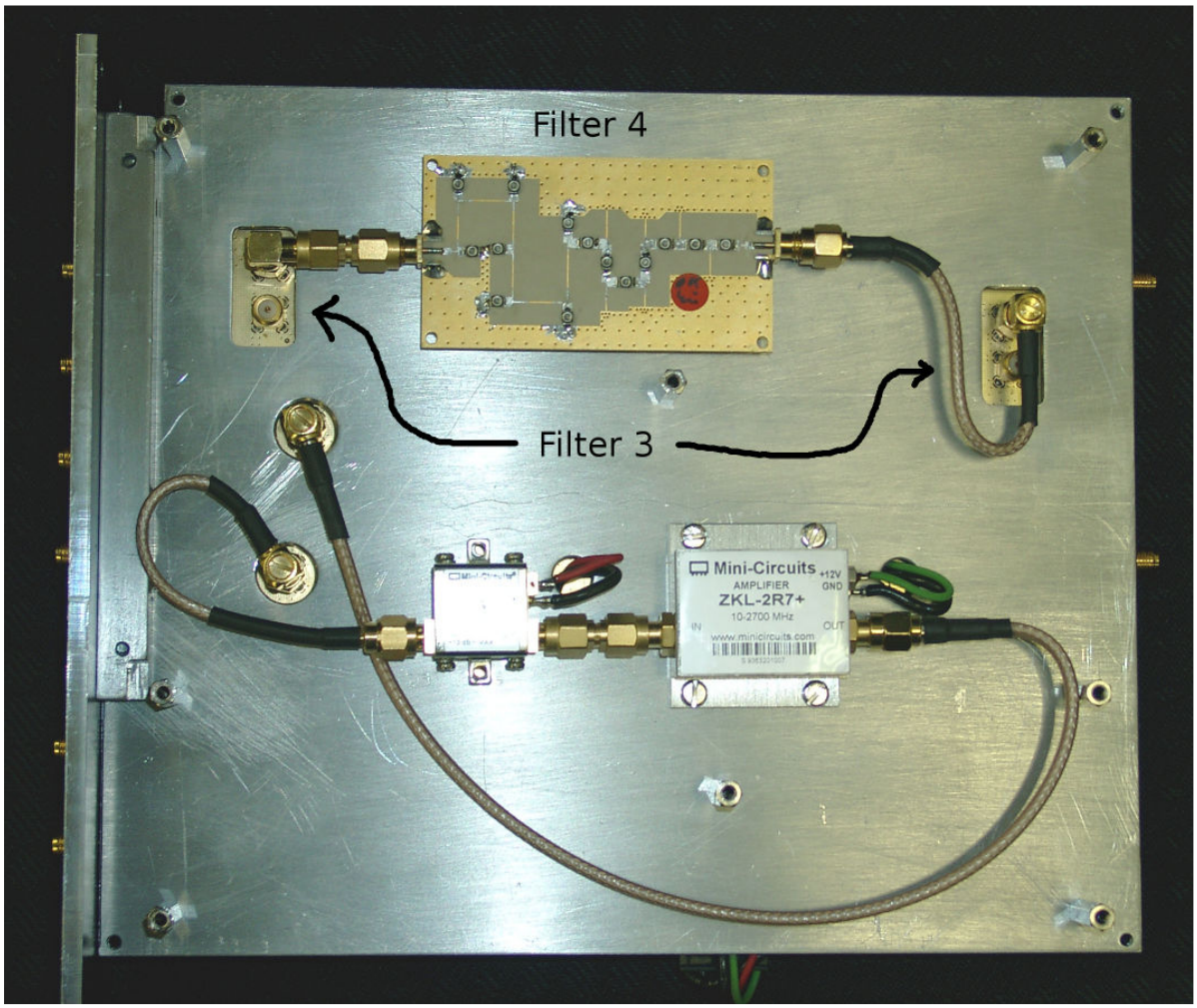
Connect Unica3 to DBBC with long control cables. Put board on the bench. Start the **AGC_IF** software on the DBBC.

Set the jumper to CoMo A (as shown in the picture). Use the software to change the RF inputs of CoMo A. The LEDs on the board edge should change. Set the filters 1-4. The LEDs should change accordingly. The positon of all the LEDs is shown in the next picture.

Set the jumper to CoMo B. Test inputs and filters again. Repeat everything for all possible four board addresses. After that, set the board to CoMo A for further testing.

Picture of the assembled board:





Input selector:

Set the network analyzer to 10 MHz to 2.5 GHz, output level -2 dBm. Connect output of network analyzer to RF In 1. Connect input of network analyzer to RF Out. Use software to select input 1. You should see more or less a straight line, since RF Out is just a copy of the unmodified input. There is some degrading from 2.5 GHz on due to the switches and power splitters.
Select input 2 with software. There should be low level noise only. Connect cable to RF In 2 to check for the input signal. Repeat this procedure for inputs 3 and 4. After that, reconnect the cable to RF In 1.

Filters and filter selectors:

Connect input of network analyzer to IF Out. Use software to select filters 1- 4.
There should be some sort of response in the filters range. Filters 3 and 4 are external. A test cable between outputs and inputs will at least show that the signal path is working, in case these filters are not populated. Select Filter 1 again. There should be some filter curve, even when not calibrated.

A similar output must be visible on RF Mon. It is a copy of IF Out, but about 6dB less in power.

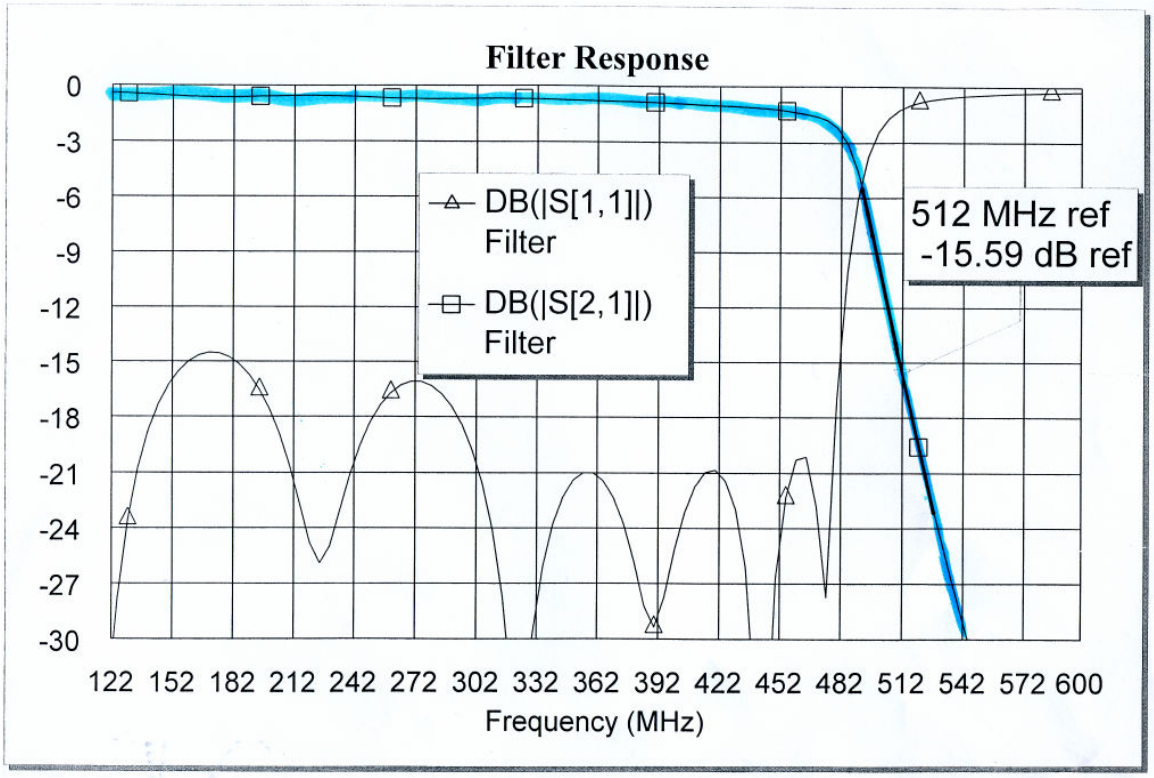
Attenuator:

Use software to set AGC off, Attn. 0. There should be a big increase in level.Change attenuation from 0 to 1, 2, 4, 8, 16, 32, 63. You should see the level change in respect to the settings. This makes sure that every control bit for the attenuator is working. After that, set the attenuation to 31. Attention: these are steps of 0.5dB, a setting of 31 means an attenuation of 15.5dB.

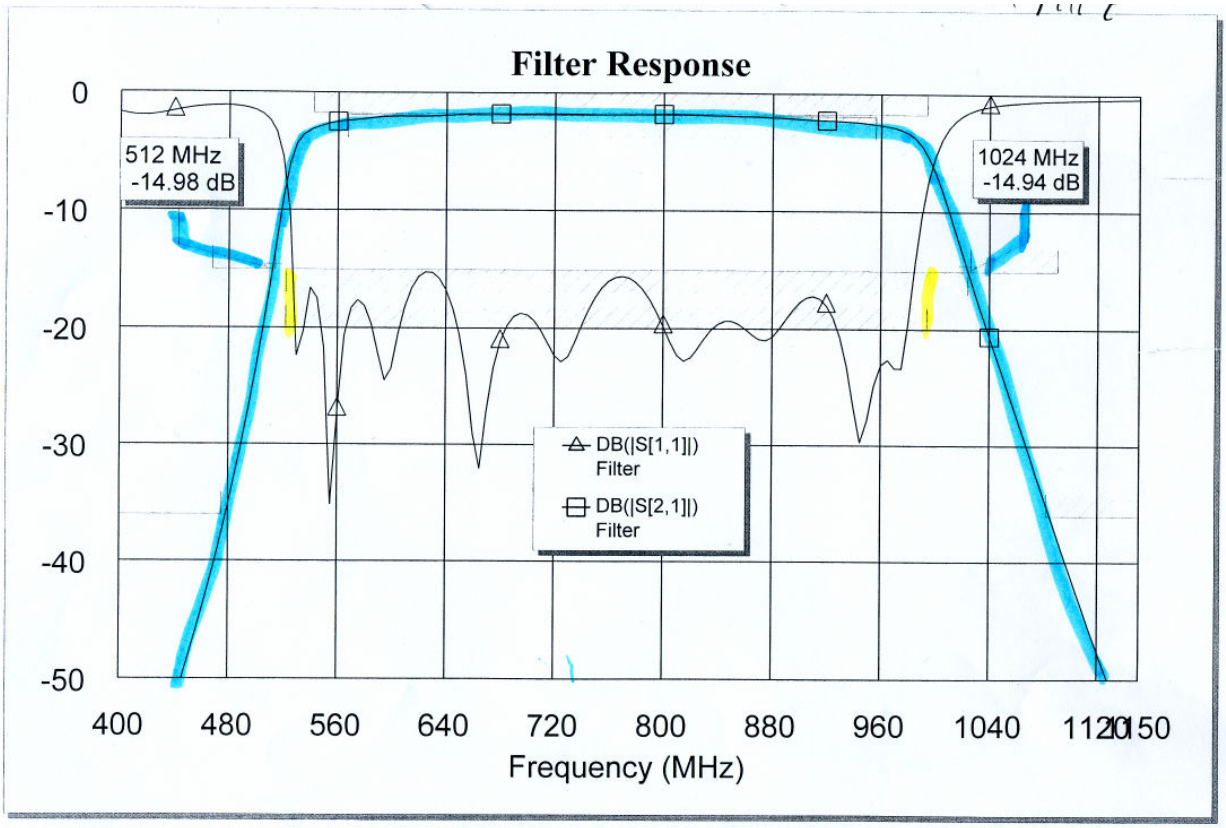
Filter calibration:

Use software to select the filter and calibrate like in the following (ideal) filter curves. It is very helpful to pre-adjust the capacitors after soldering. There are sketches in Appendix A.

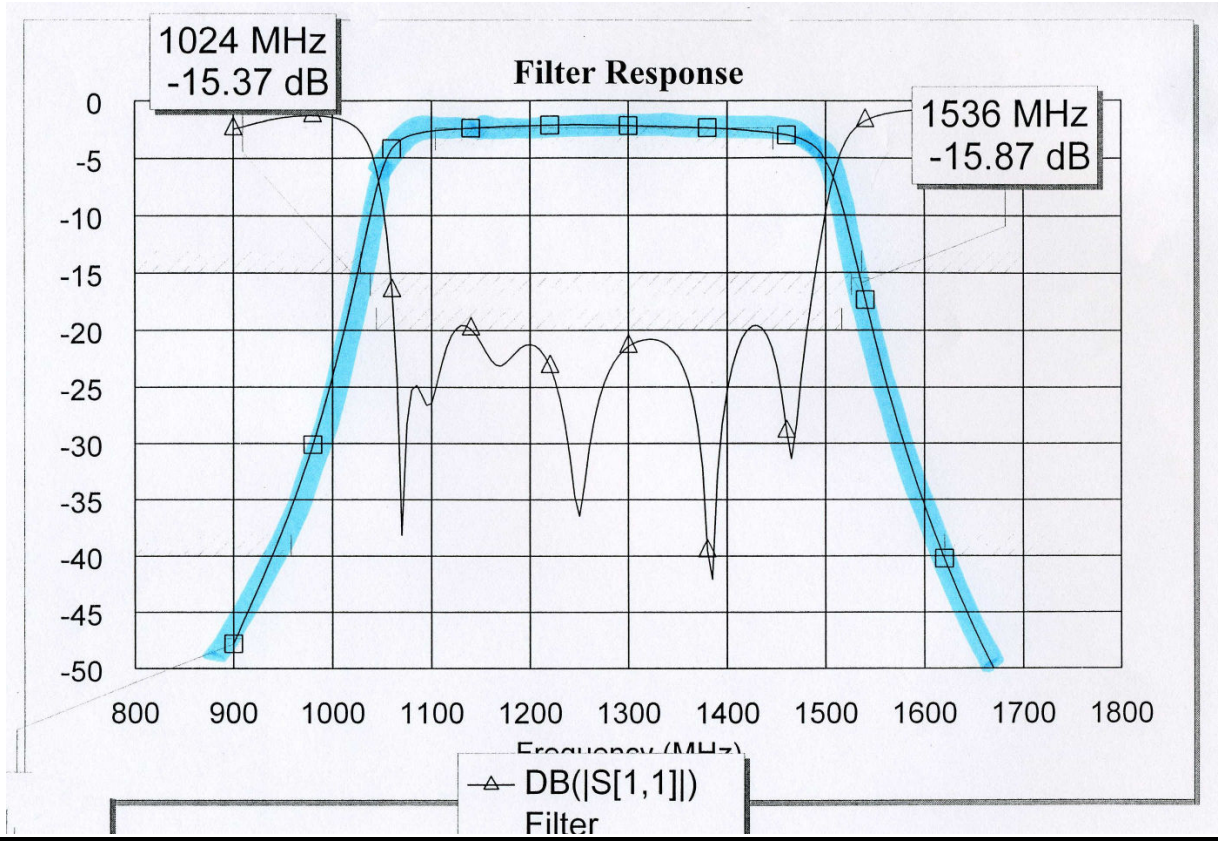
Filter 2: 0 – 512 MHz



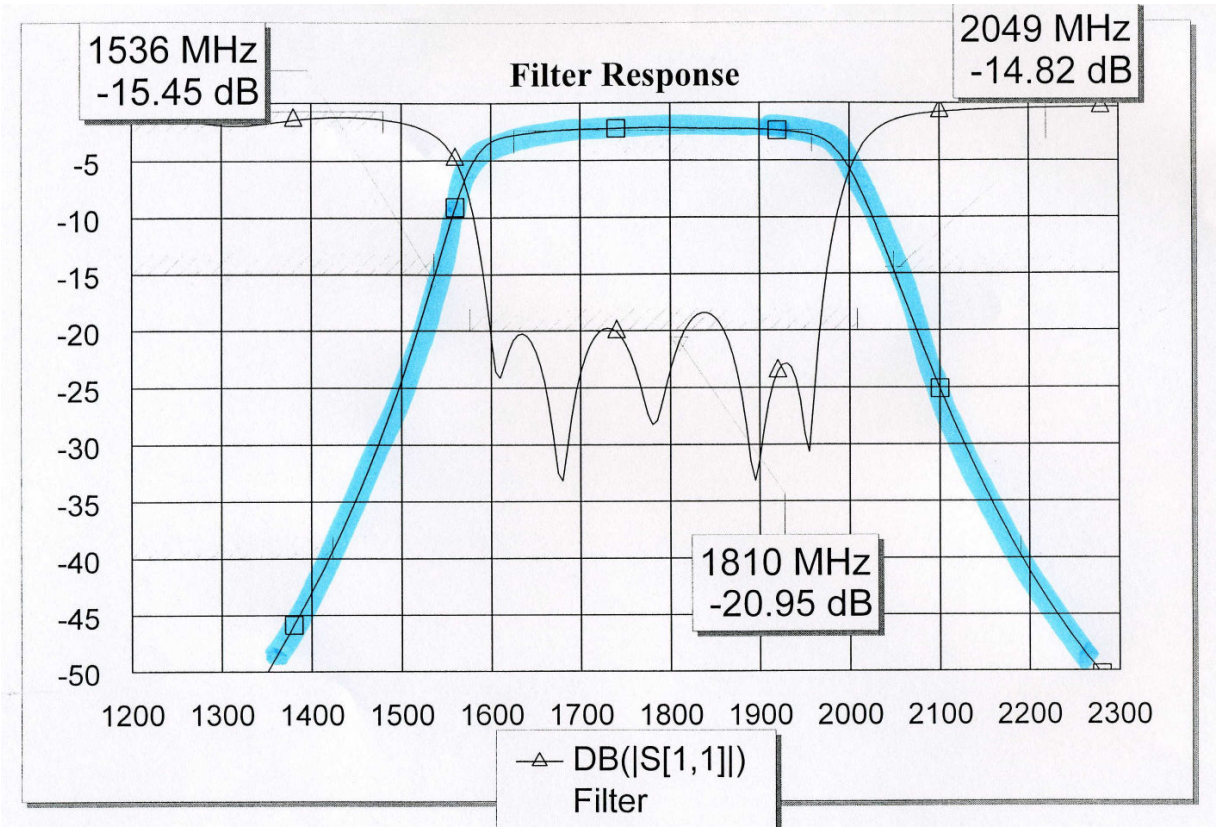
Filter 1: 512 – 1024 MHz



Filter 4: 1024 – 1536 MHz



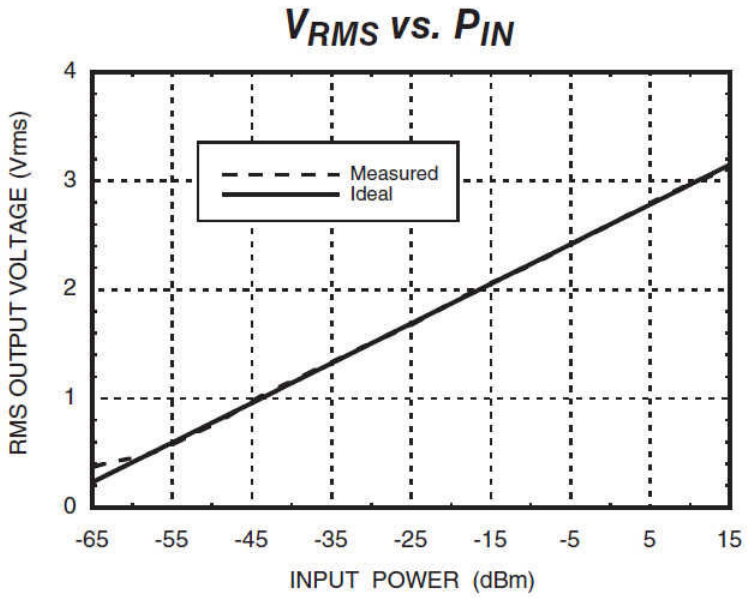
Filter 3: 1536 – 2048 MHz



Total power calibration:

We use a power detector from Hittite, it is the HMC610LP4. Unfortunately the output voltage is not in a range the DBBC PC can measure directely. For compatibility reasons with Unica2 we limit the measuring range to -48 dBm to -3 dBm. Therefore it has to be converted on the board. The raw voltage in a range from 0.5 to 2.4 Volts is shifted to a range of about -2.45V to +2.45V and then converted to digital, producing 500 to 64000 counts.

Some users are interested to monitor the raw voltage continuosly. For that reason the latest Unica revision (4.2) has a buffered output to provide that. The earlier boards (Unica3 up to 4.1) can be upgraded. There is a procedure in Appendix B.

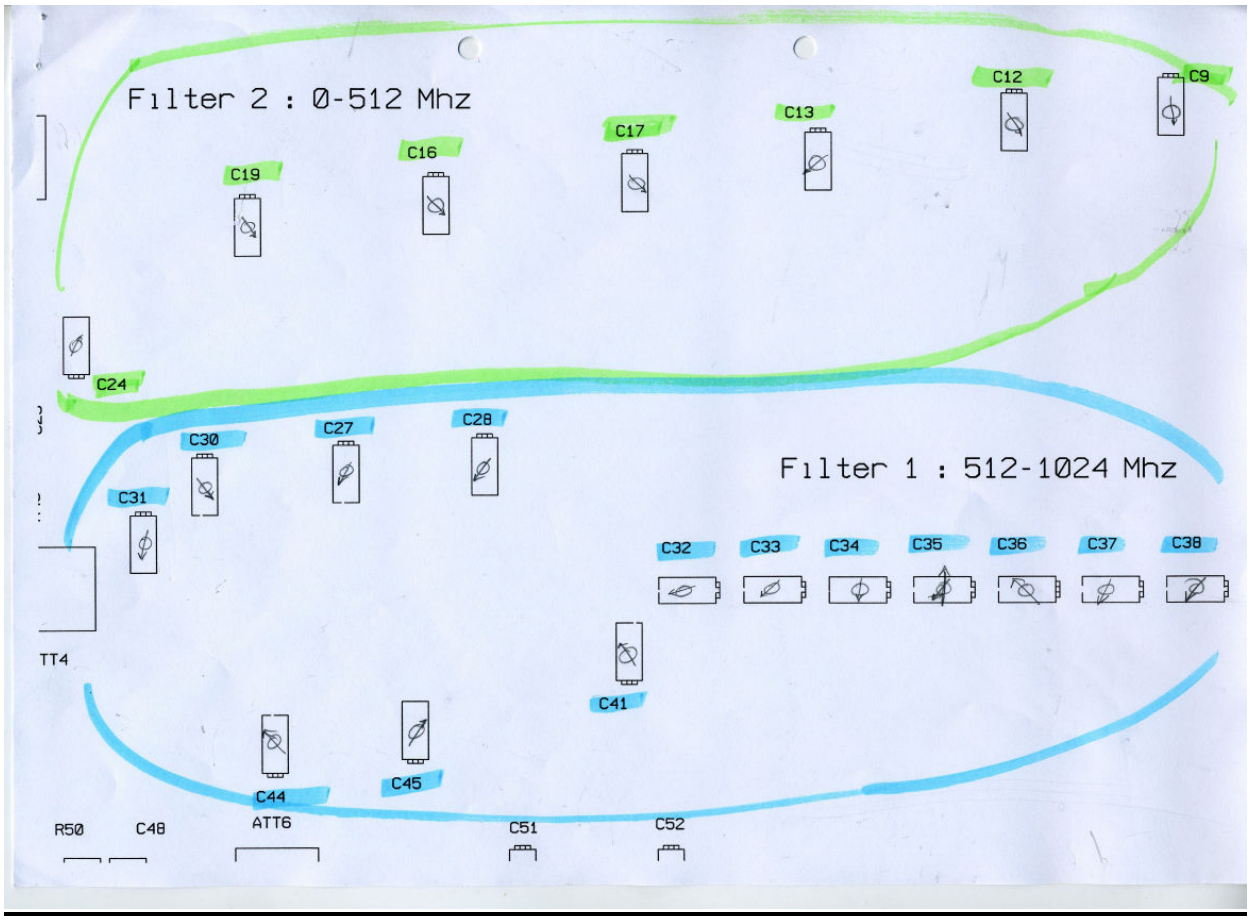


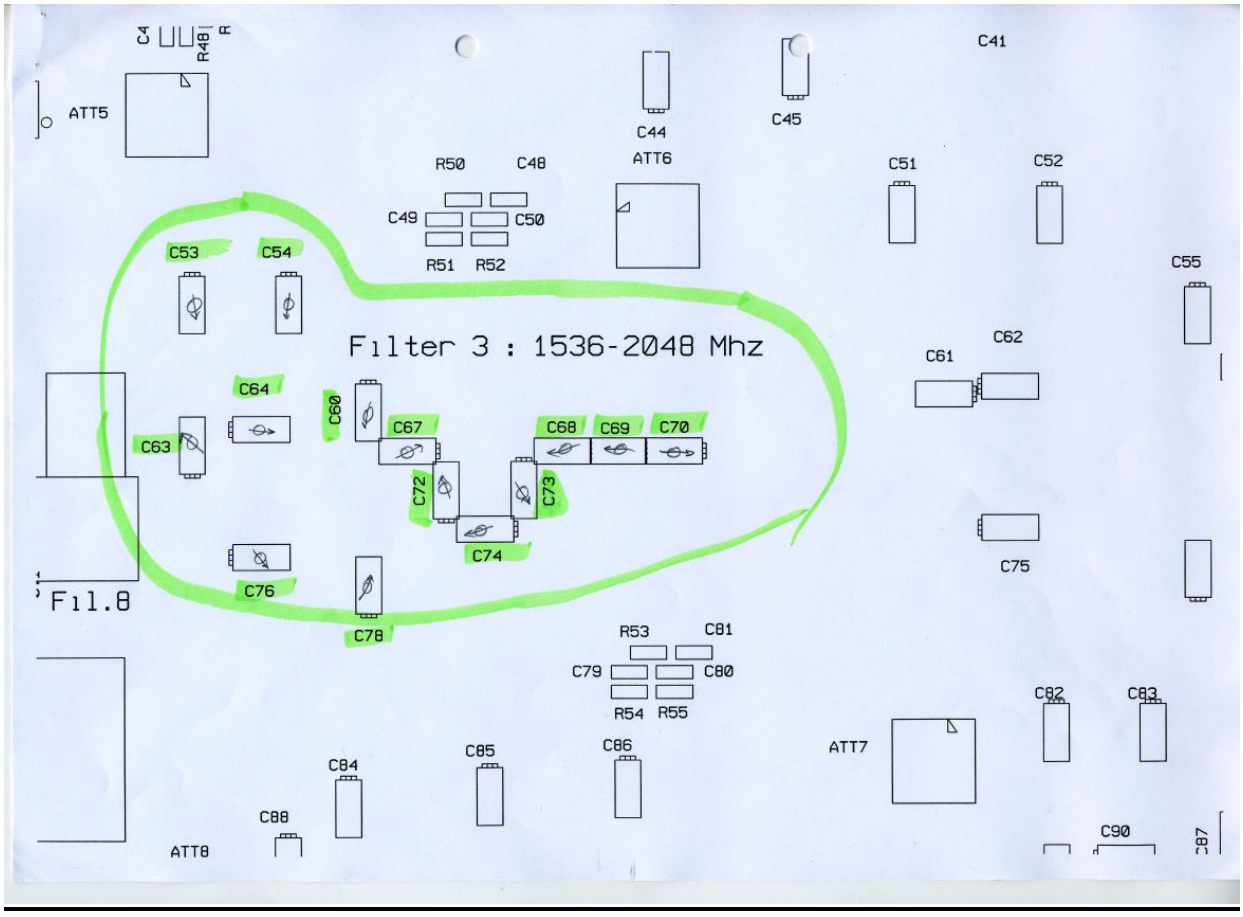
- Connect a synthesizer to RF IN 1. Set it to **755 MHz, -23 dBm**.
- Use software to select input 1, filter 1. Set attenuation manually to 31 (15.5dB).
- Connect voltmeter to TP Out (or the test point nearby).
- Adjust OFFSET to about 0V with VR2 (lower potentiometer)
- Set synthesizer to **-48 dBm**.
- Adjust GAIN to about -2.45V with VR1 (upper potentiometer)

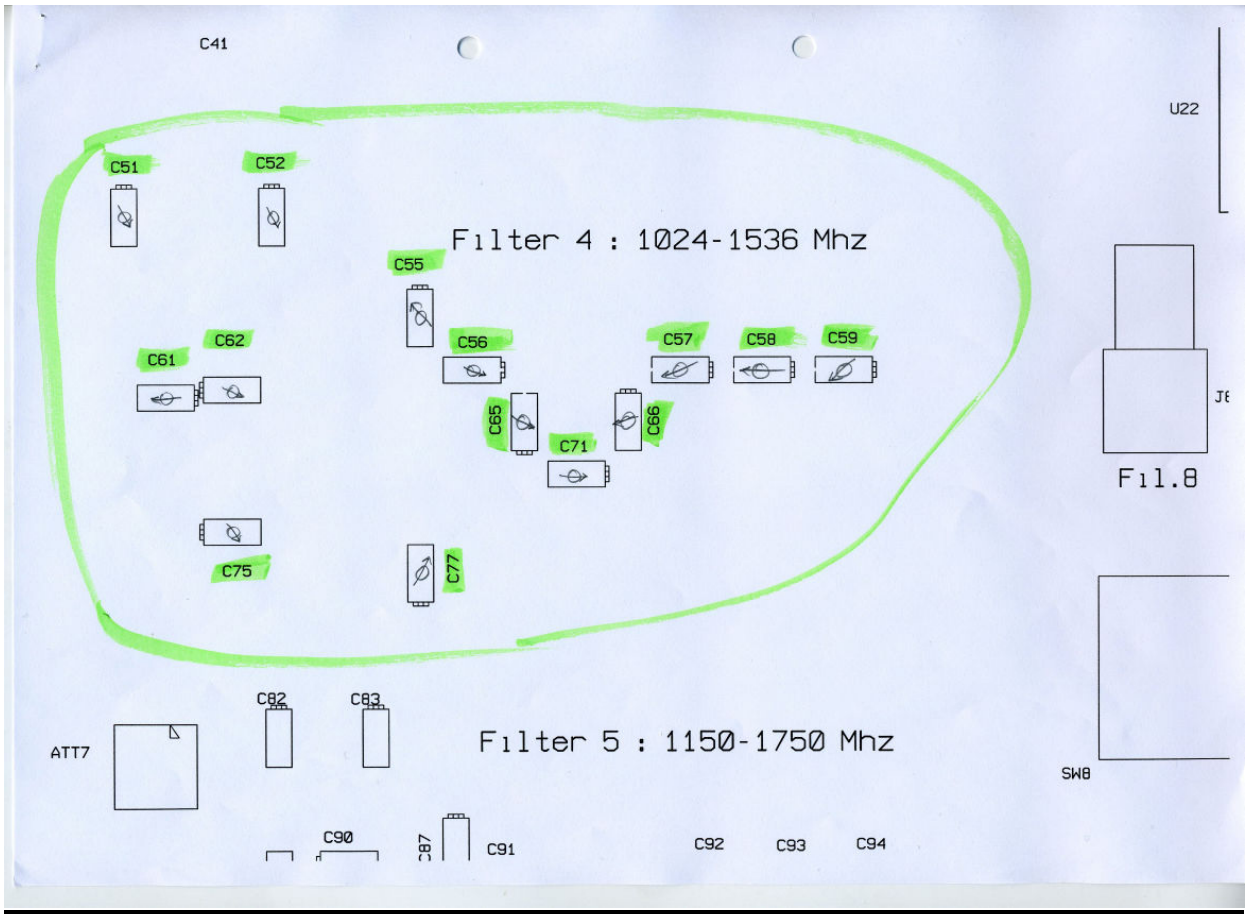
-..Connect TP Out to TP cable of your DBBC.

- Set the synthesizer to **-3 dBm**. Software will show about 58000 counts.
- Adjust Gain (VR1) to about 62000 counts.
- Adjust Offset (VR2) to about 64000 counts.
- Repeat adjustments until **-48 dBm** shows about **500 counts** and **-3 dBm** shows about **64000 counts**.

Appendix A: Pre-adjustment of the filter capacitors

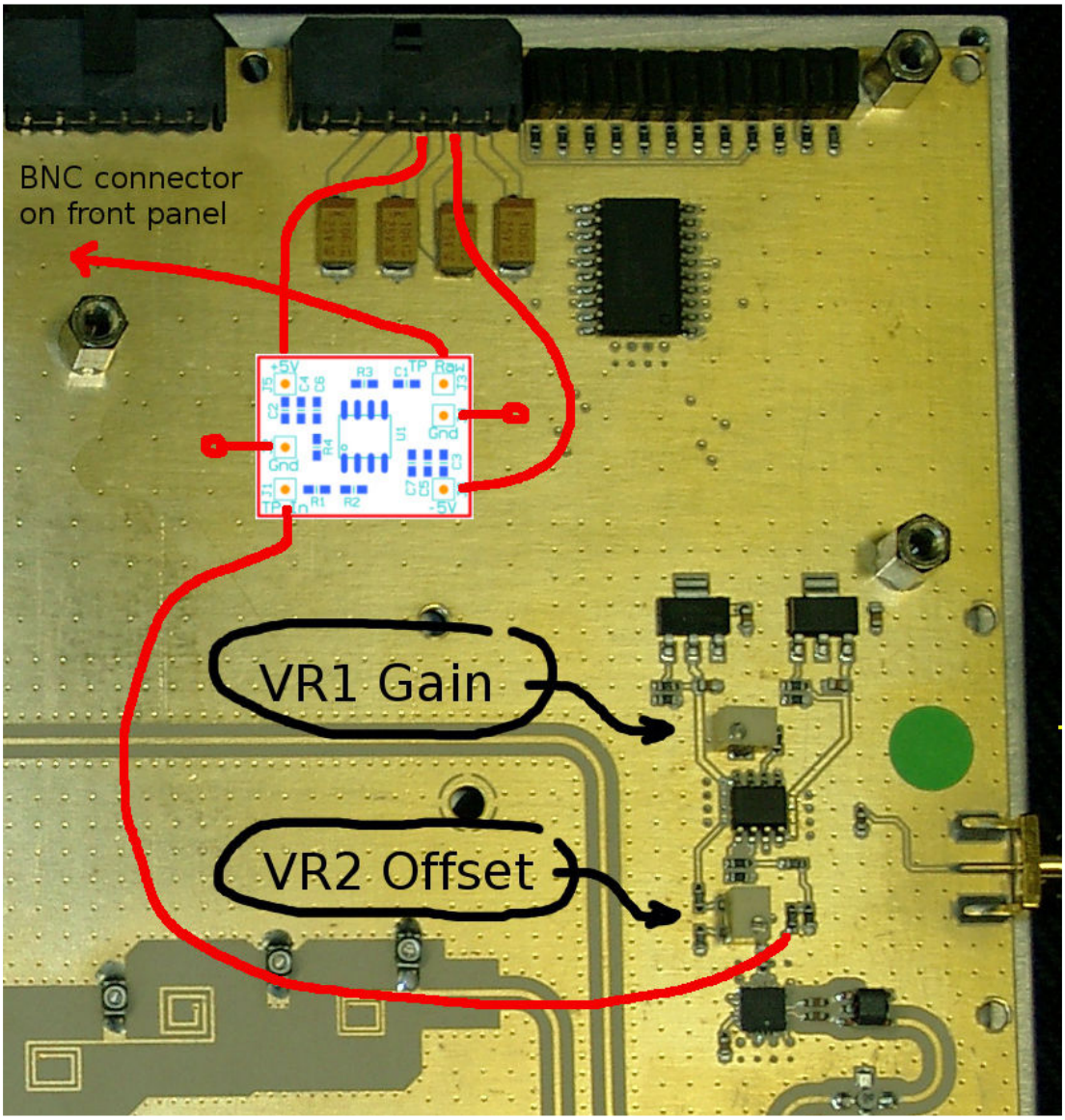




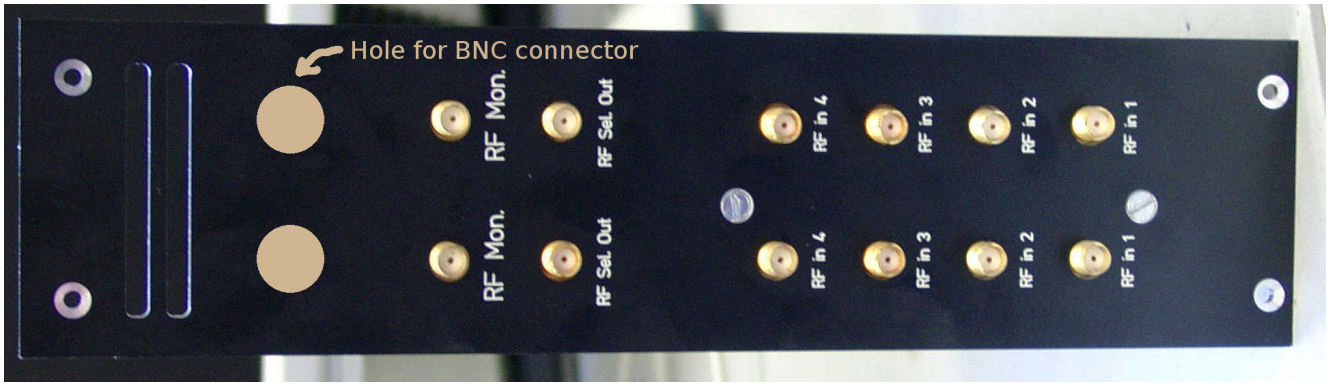

C41
U22
C51
C52
Filter 4 : 1024-1536 Mhz
C55
C56
C57
C58
C59
C61
C62
C65
C66
C71
Fil.8
C75
C77
C82
C83
ATT7
Filter 5 : 1150-1750 Mhz
SW8
C90
C87
C91
C92
C93
C94

Appendix B: upgrade to continuos TP monitoring

One way to do this could be to just solder a wire to the appropriate pin and use an external connector, like a BNC socket. The voltage would be unbuffered and some short in the external cables would disable the TP monitoring in the DBBC.
We suggest to use a simple buffer on a very small PCB which is available through us. This board can be placed and glued on the Unica3 and connected with a handful of cables.



Below there is a Unica4 panel. The Unica3 panel can be modified in the same way.



For further information please contact us.