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 **Author**

**Topic: JDSU J745A spectrum analyser / VNA repair & mini review (Read 8837 times)**

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 **nctnico** 

Super Contributor



Posts: 28653

Country: 



 **JDSU J745A spectrum analyser / VNA repair & mini review**

« on: March 27, 2022, 06:27:36 pm »

## Need a VNA...

Or maybe not. I'm running more and more into situations where I could use a VNA and/or spectrum analyser with a tracking generator that works up to 1 or 2 GHz. I have a network analyser but that only works up to 300MHz. A spectrum analyser with tracking generator is useful for analysing impedance of components and my current spectrum analyser doesn't has a tracking generator. I could make do with a sweeping RF generator but for quick measurements this process is too slow. Some VNA features to check impedances would be nice as well. I already have a NanoVNA but even with PC software it is still very limited. Especially where it comes to dynamic range All in all I don't need a real VNA but something that is close.

High on my wishlist is the ability to save images on a USB stick and at least a TFT screen.

I looked at getting a Rigol or Siglent network analyser but decided not to in order to avoid firmware related surprises. I want a device with mature firmware; I've been burned too many times now. So I went hunting on Ebay to see what is available on the used market. Initially I found some older but nice high-end VNAs from R&S and Agilent but even faulty ones go for silly money. Also these would require quite a bit of tinkering to add saving screendumps to a USB stick. Looking further I found several base station analysers that also have spectrum analysis and VNA features. At the lower end sits the Tektronix Y400 (should have the YBT250 and YBA250 modules for most flexibility) which seems to sell around \$500 (2.5GHz IIRC). In the middle sits the JDSU 745A/B (4GHz) that sells around \$1000; at the higher end you can find the Anritsu MS2721B which is

around \$2000. Shariar from the Signalpath Youtube channel did a repair / review video on the MS2721B and noted that the spectrum analysis mode is rather slow. So even though the MS2721B works up to 7GHz the slow speed doesn't make it a very desirable unit. I opted to get the JDSU JD745A or B and managed to buy a JD745A. There is also a B version but the specs look to be identical. A higher frequency model is also available but these cost more obviously. The unit I bought had a problem with the pre-amplifier so I managed to haggle down to a nice price.

The JD745A has been designed by Gencomm (a Taiwanese company) and the company JDSU seems to have been taken over by Viavi which is a company that is big in mobile and telecom related test equipment. I have come across Viavi before so to me it is a known brand which sells equipment for professional use. All firmware / software and manuals can still be downloaded from the official website so that is a big plus.



A battery and OSL VNA calibrator are included as well.



The sunglasses shown in the datasheet are missing though. Pity, I think they would have looked way cooler on me.

There are several other repair threads on EEVblog for this unit:

<https://www.eevblog.com/forum/repair/jdsu-jd745a-base-station-analyzer-repair-log/>

<https://www.eevblog.com/forum/repair/viavi-celladvisor-jd785a-repair/msg3949858/>

The first link also contains information about getting into the Linux system. That allowed me to make dumps of the flash memory onto a USB stick so I have a backup of the entire flash. Making a backup also showed an interesting effect: at high processing / memory load the display image gets distorted. Since the display memory is likely shared with the main memory, I guess this is set at a lower DMA priority than other memory accesses. During normal operation the display gets distorted every now and then but it is not a major issue.

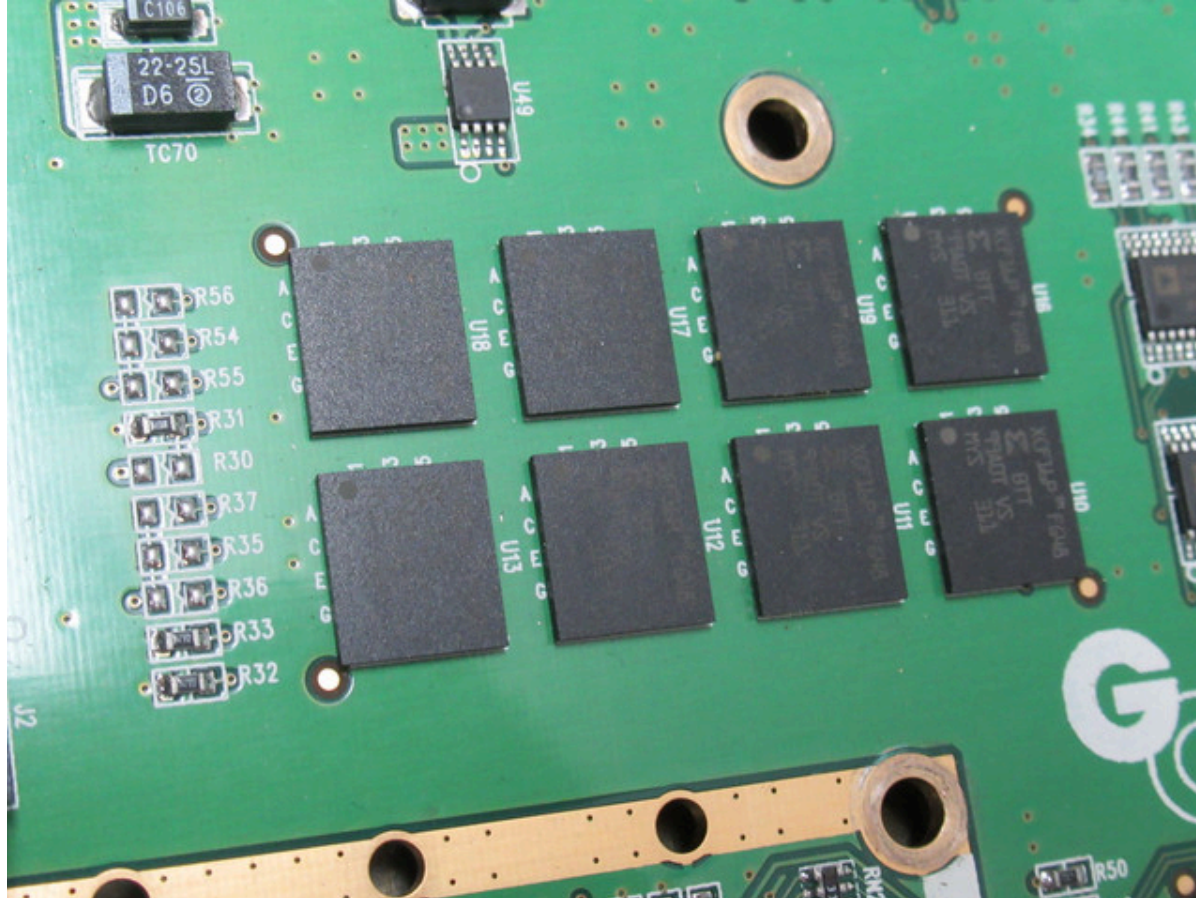
### **Taking it apart**

Inside there is a stack with 3 components. First the main board:



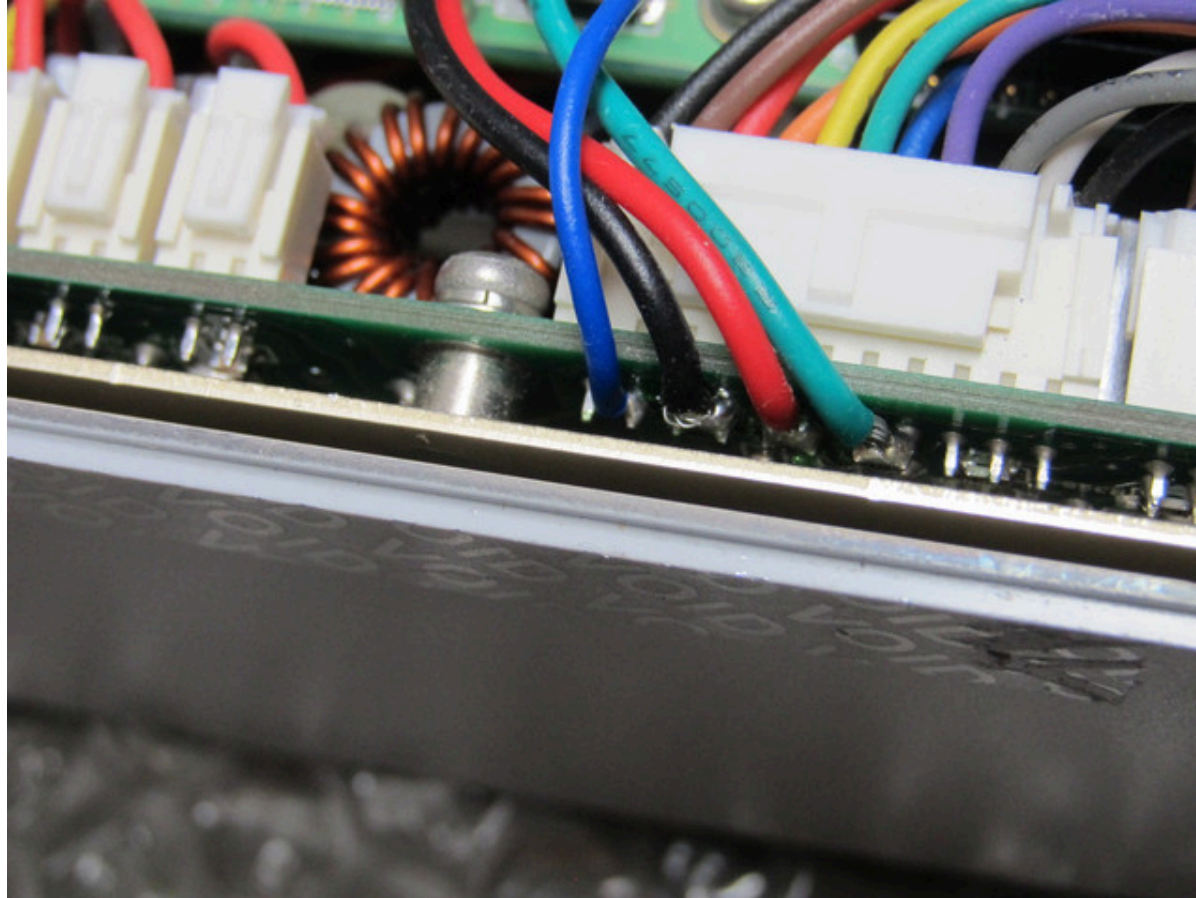


This has a processor from Marvel, an FPGA, a GPS receiver + OCXO and the signal processing from the VNA and spectrum analysis module. The little add-on module is used for E1 / T1 analysis. This module / option can only check if there is a valid signal; it doesn't have the ability to do higher layer analysis.

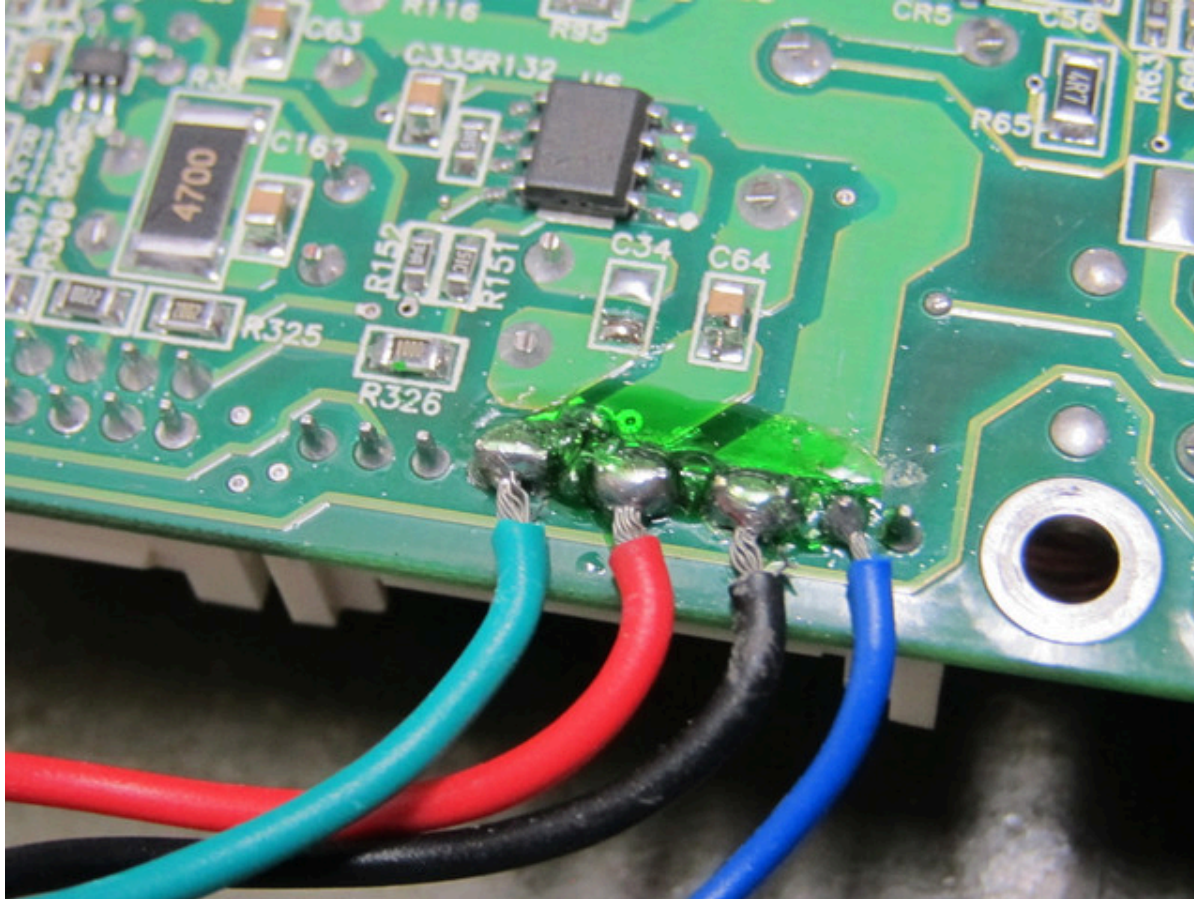


For a minute I was thinking that the mainboard has a whole bunch of Xilinx FPGAs on it but these are flash chips to hold the FPGA configuration. I find this a very unusual setup. I would load the FPGA from the processor so the design is cheaper and the FPGA image can be updated together with the software. Maybe this was easier to split development across two teams though.

The bodge wires from the mainboard go to the power supply:



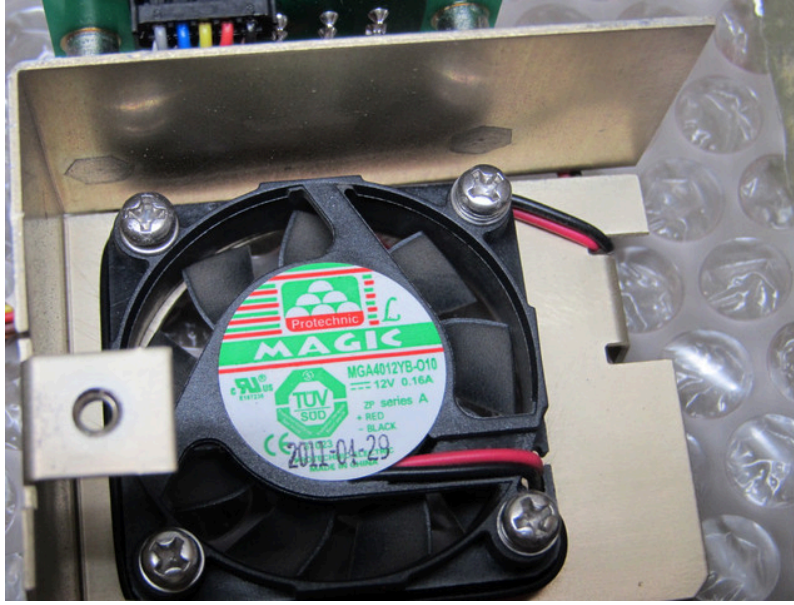




The soldering joints ain't bad but I applied some hotmelt glue (hot-snot) over the wires as a strain relief otherwise this is an accident waiting to happen. Didn't take a picture afterwards though.

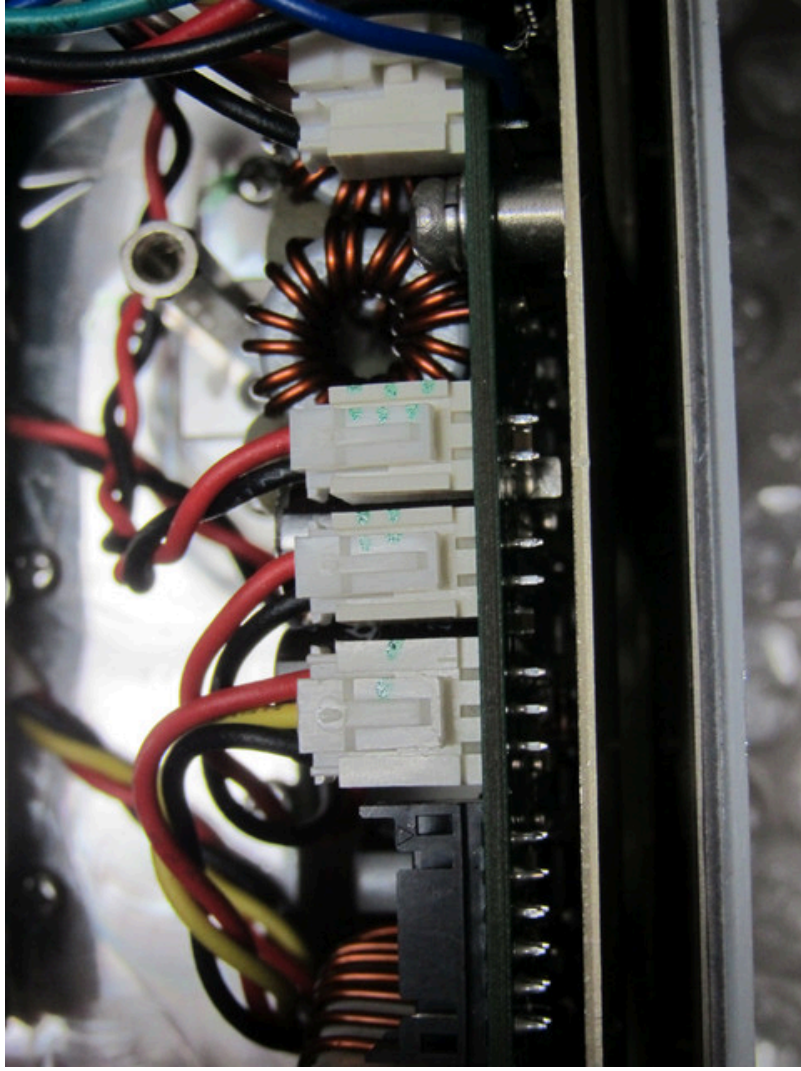
A very loud fan:



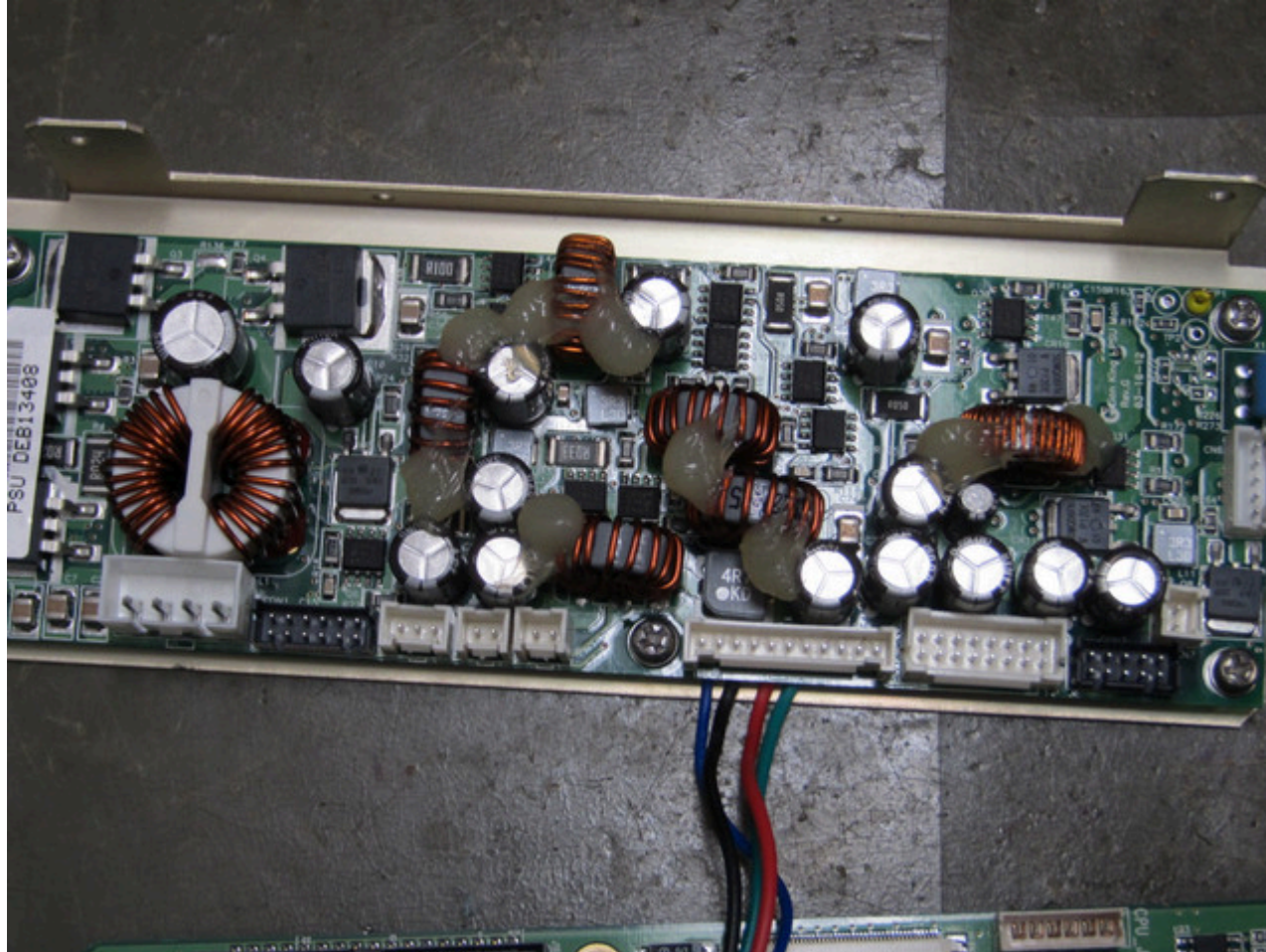


I have replaced this with a 20mm fan with the same power rating but lower RPM. This gives the same air pressure to pull air through the casing at lower noise.

Marking the connectors before removal:

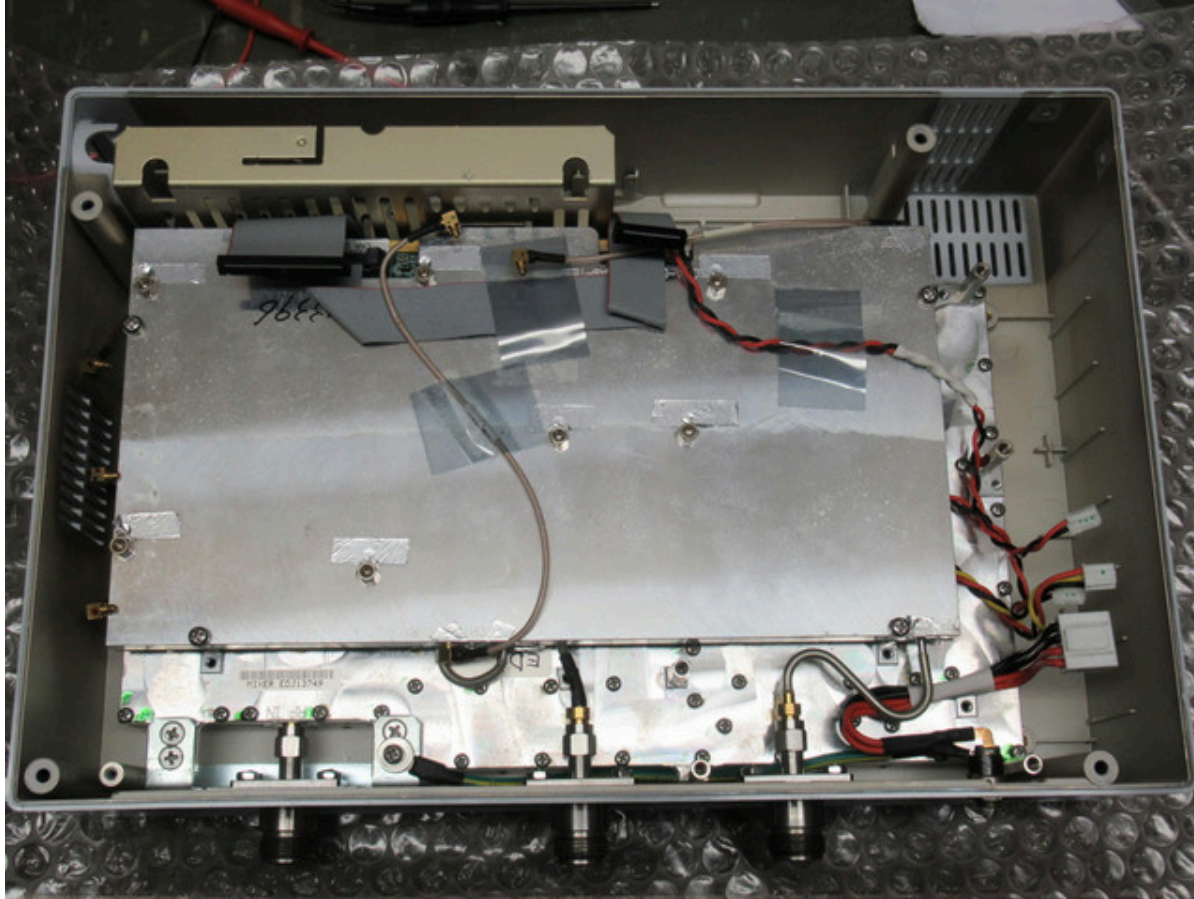


The PSU:



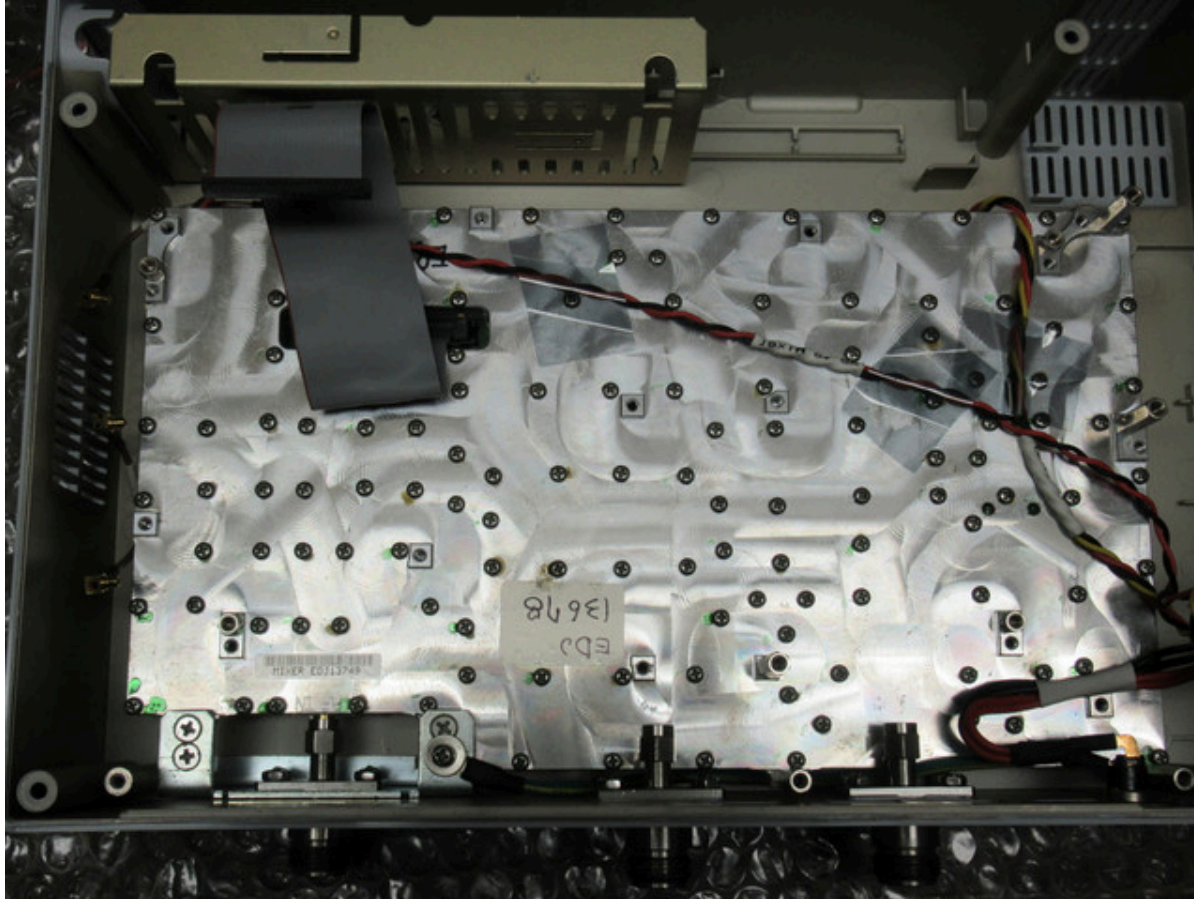
Next out is the VNA module:





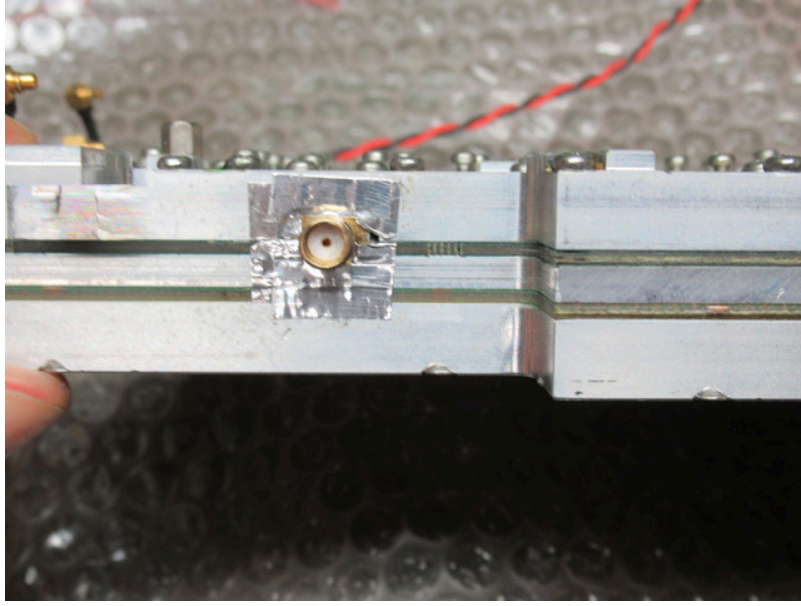
Last but not least, the spectrum analysis module:

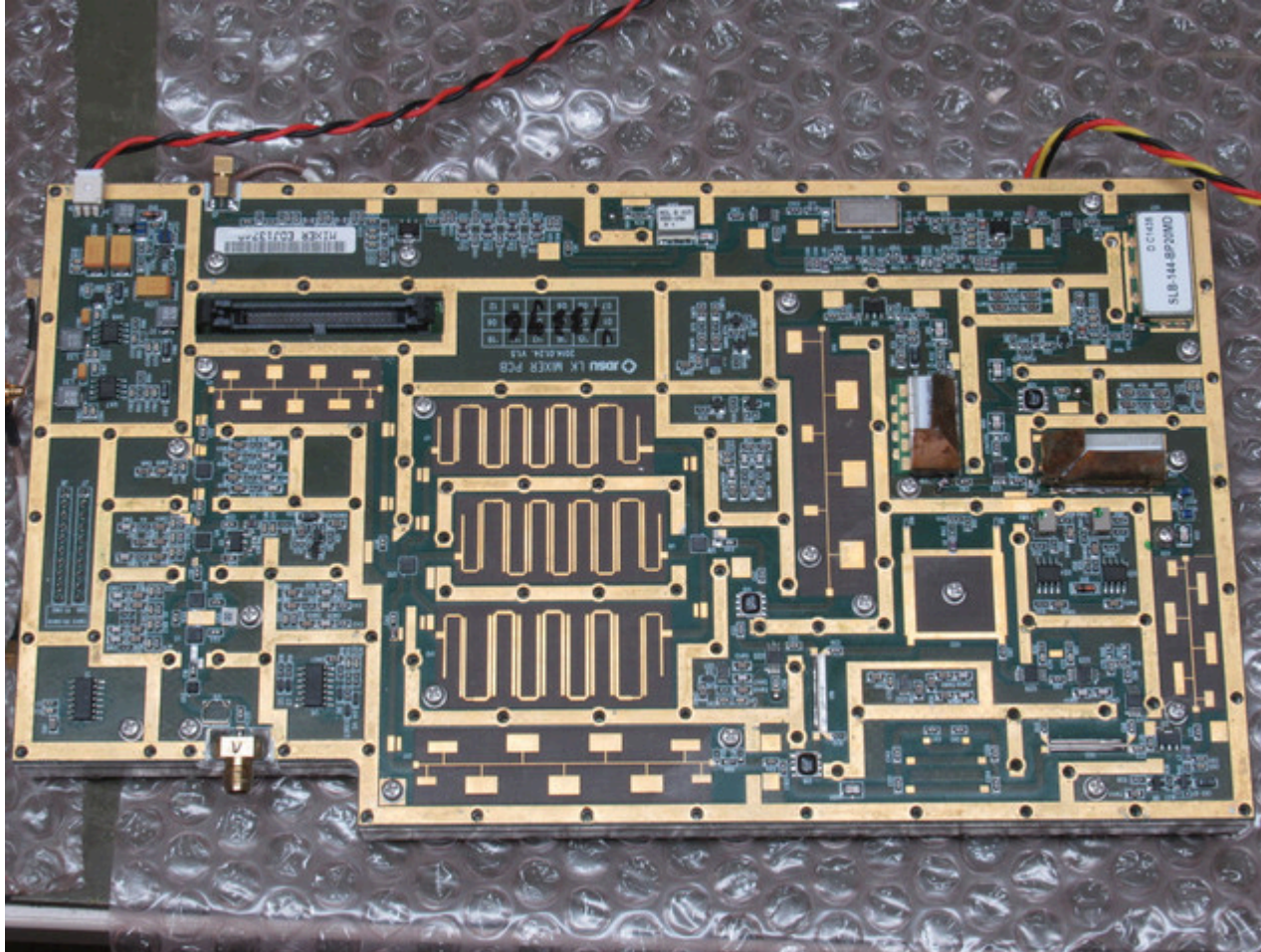




So the interesting part is that the JD745A has separate spectrum analyser and VNA modules instead of trying to combine these into one.

After undoing over 100 screws it showed it's inside. At least, half of the inside. There are 2 boards sandwiched between 3 aluminium blocks.

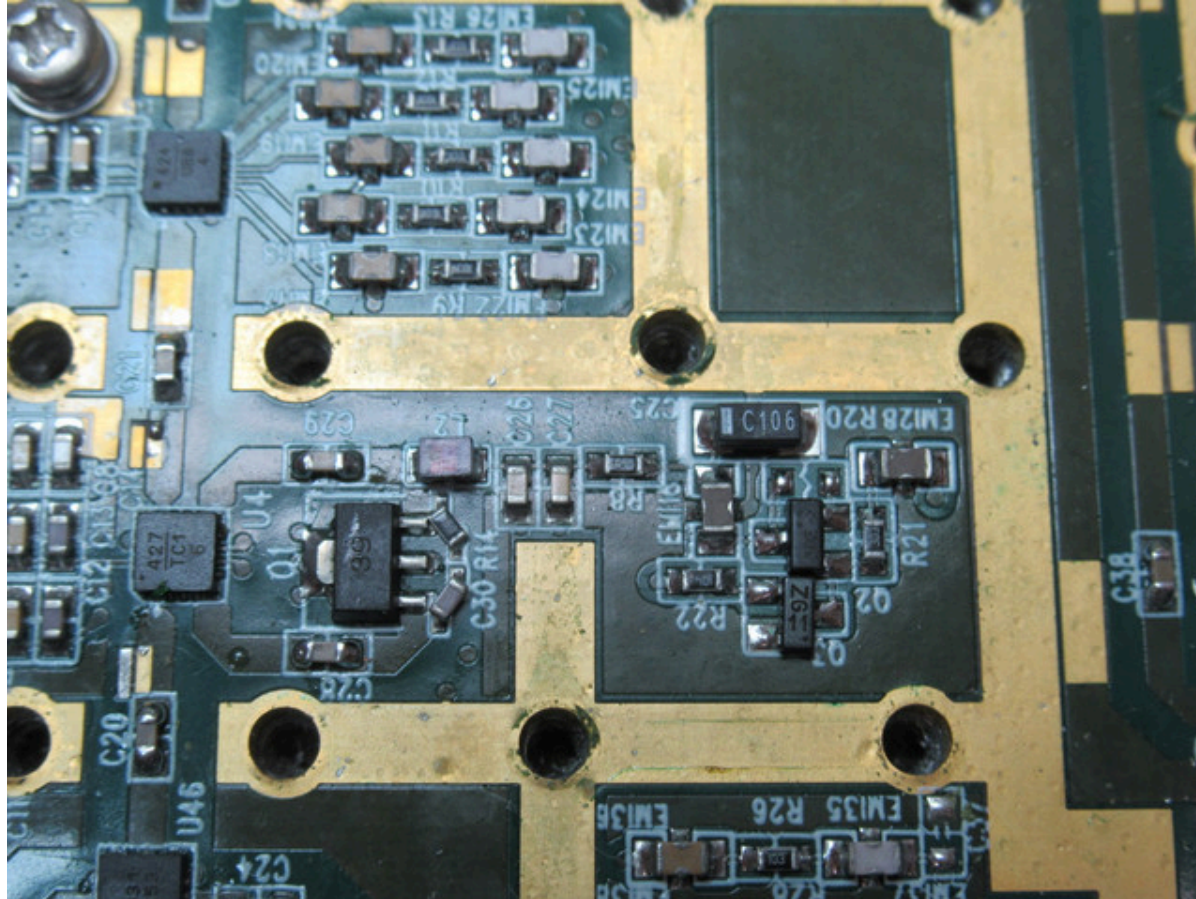




A quick overview: the signal enters at the bottom left corner and enters into a 0dB / 20dB attenuator, pre-amp and fine attenuator section towards the black connector. Then it goes through a lowpass filter down into a switch which allows the signal to take 4 different paths. In order to keep the 1st LO frequency low, the frequency range is divided into 4 bands. The lower band goes through a lowpass filter (bottom of the PCB) while the higher 3 bands go through bandpass filters. The black blobs to the right of the filters are the 1st LO mixers. After some further filtering the signals arrive at another switch (between the blocks with the copper colored flaps on top) and goes into the 2nd LO mixer upwards to the final mixer stage. The LF out is at the left top of the board. The white block in the center top of the board is the 3rd LO mixer.

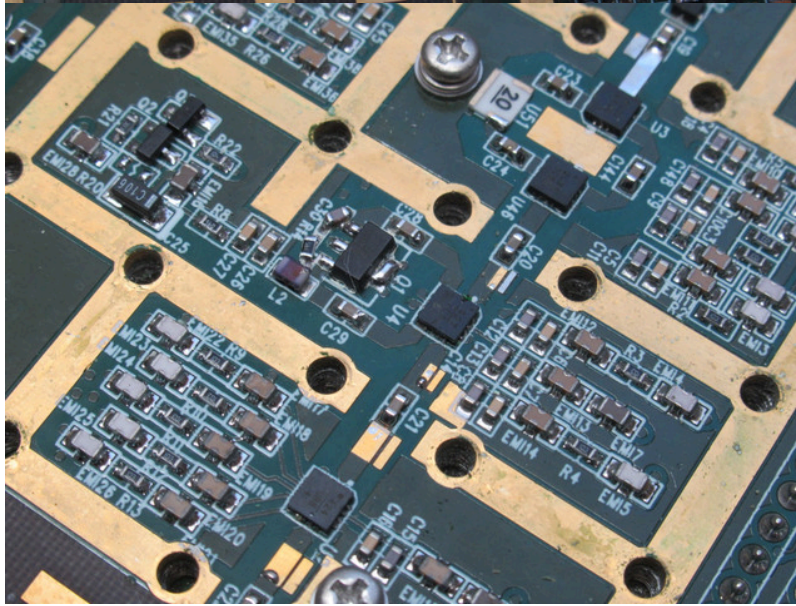
But the culprit is the pre-amp so let's take a look at that section:





At the left is an RF switch chip that selects between straight through or take the preamp path. The device marked with '39' is the preamp itself. The circuitry to the right is a P channel MOSFET and transistor to switch the preamp on/off. Remember the JD745A is a battery powered unit so low power consumption is better. Now to figure out what the '39' device is... From the circuit configuration I can see it is a typical setup for a MMIC. So I feed Google with 'mmic 39' and crossed my fingers. It turned up with a GALI-39 from Mini-Circuits. Pfew... not some kind of obscure chip. So I ordered a few and replaced it.





In the process I decided to replace the cross-head screws with Torx screws because these are easier to work with and several of the cross-head screws were already damaged.

The latter turned out to be a huge mistake:



For some reason the amplitude between some frequencies was too low. Also the preamp still didn't work. One of the things I bought the JD745 is to make scalar measurements. It seems the JD745 is going auto-level control and uses the preamp to boost the signal when it is too low.

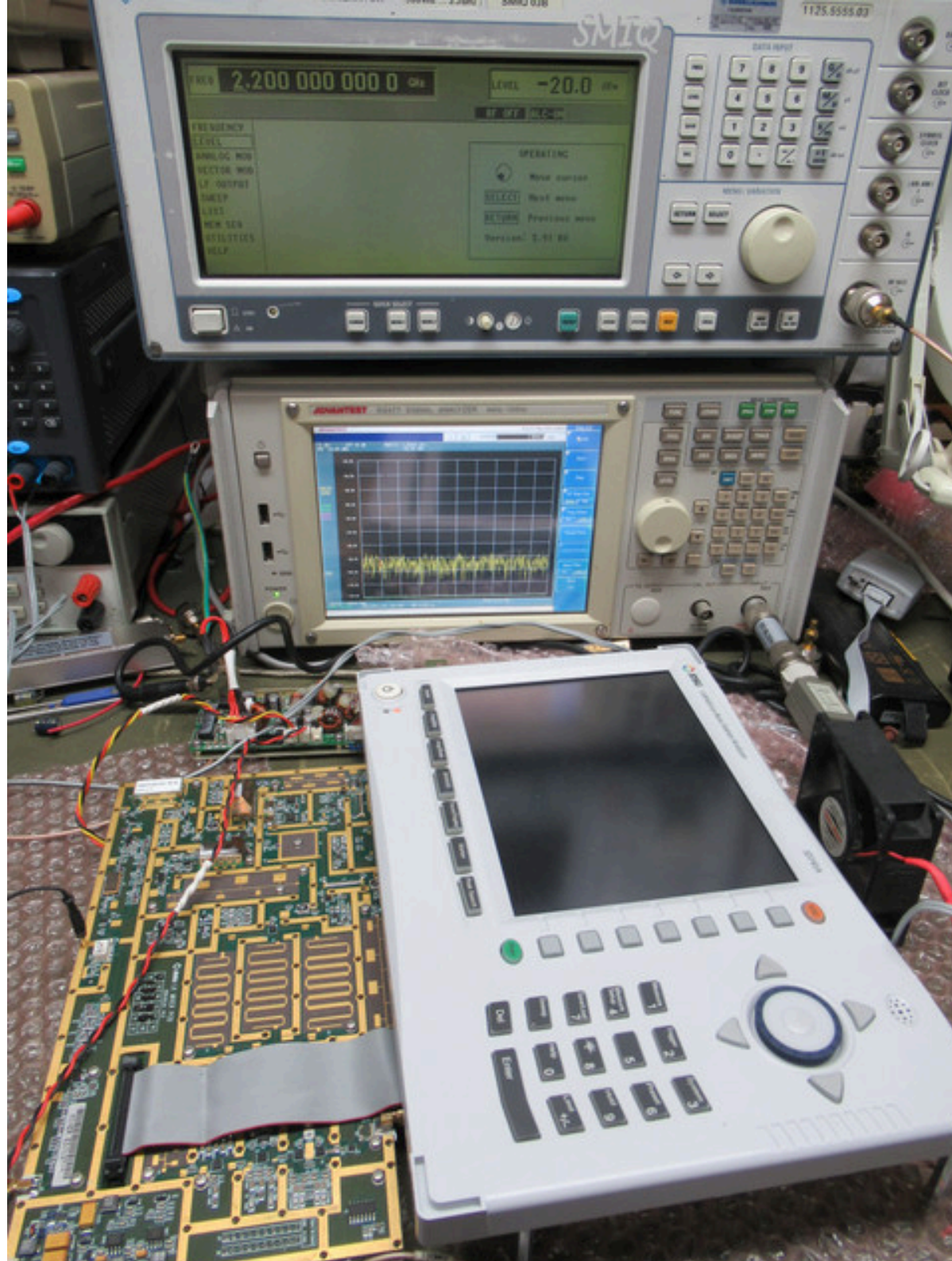
This means that the preamp really needs to work for these measurements. This is the result I got when I attenuate the signal. When the preamp is on (and doesn't work), the amplitude will drop because the JD745 thinks the signal amplitude is boosted.



Crap!!! So I had to take it apart again.

This time I tested the spectrum analysis module on the bench using an RF generator and spectrum analyser to trace the signals:

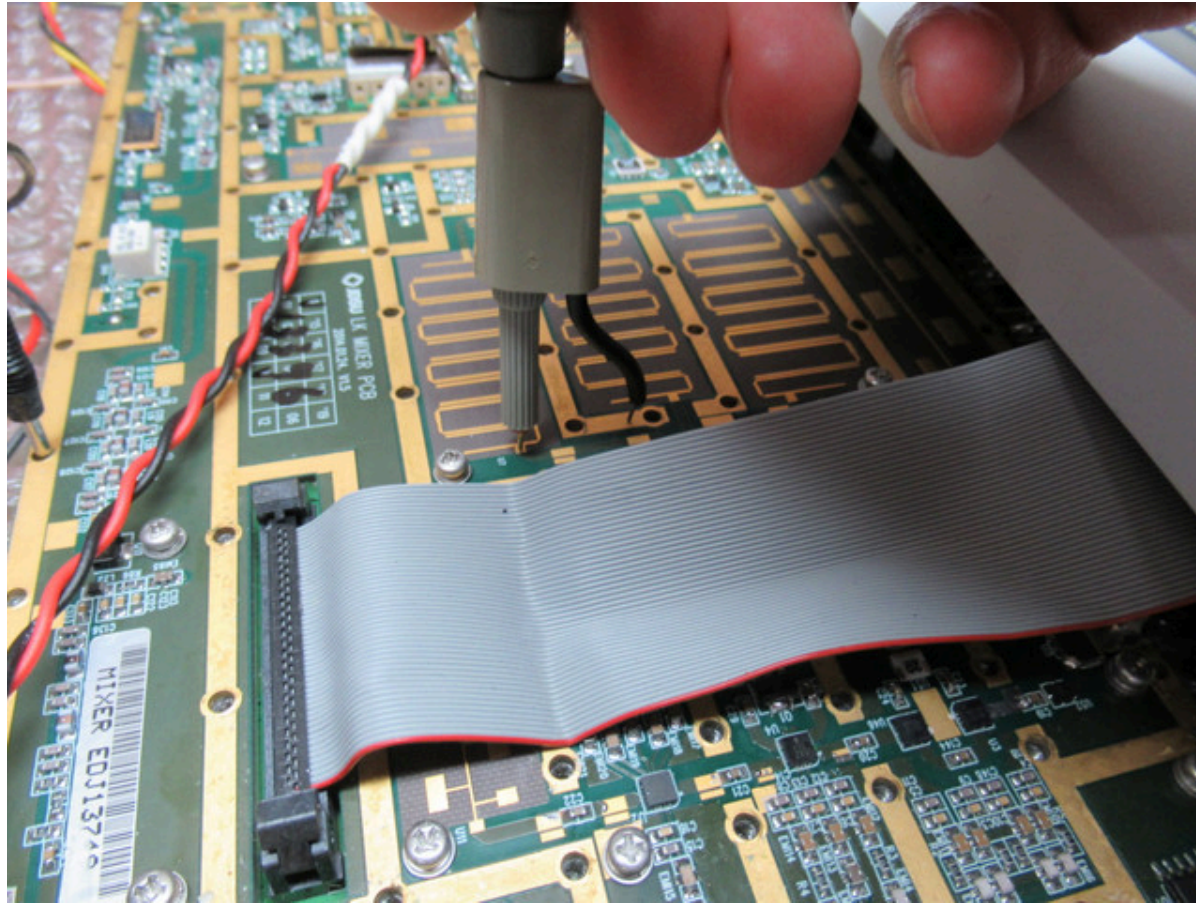






A fan provides some airflow.

A Tektronix P6156 with 20x attenuator (BW: >3GHz !) also works excellent together with a spectrum analyser to look for RF signals:

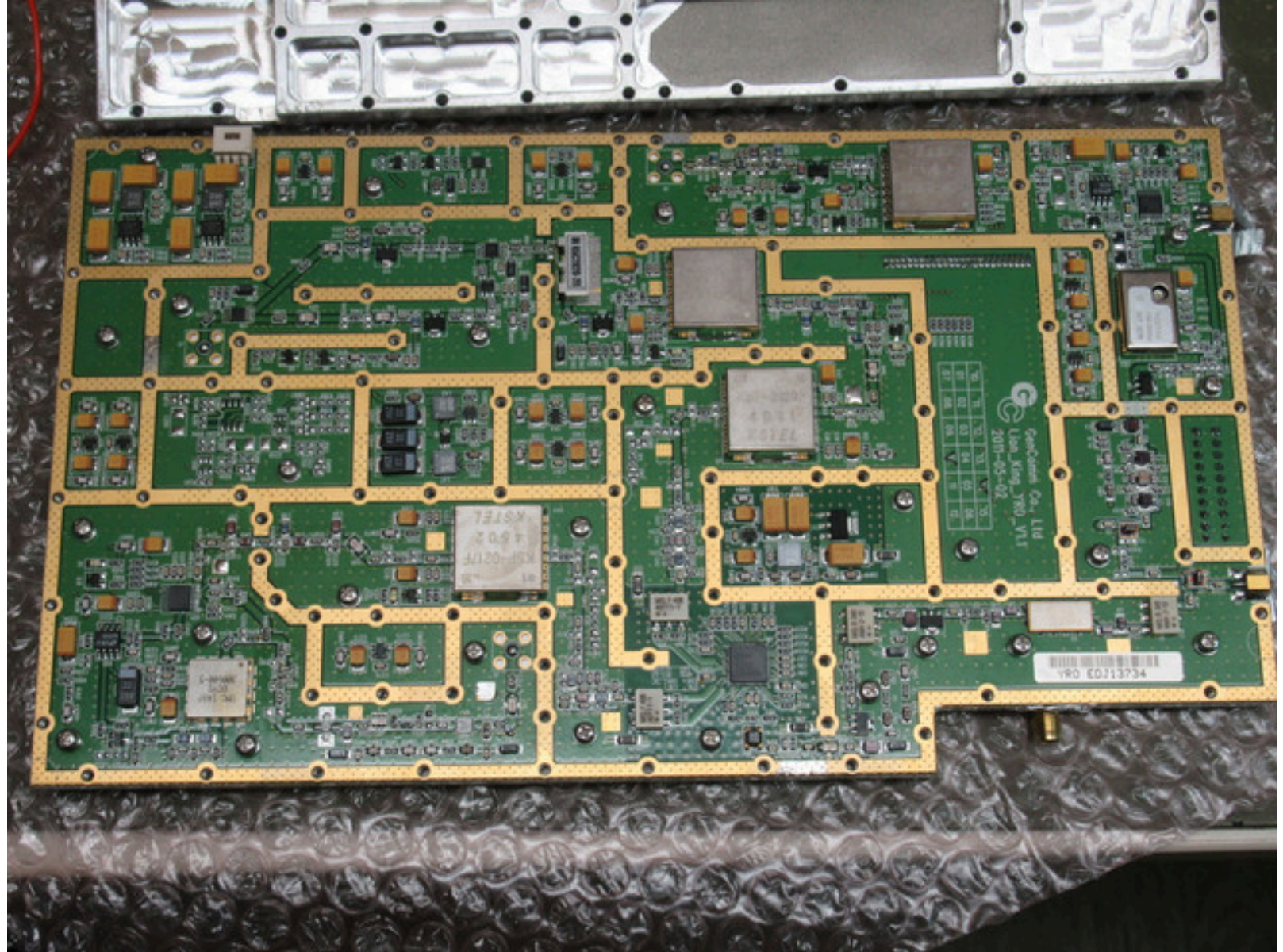


From here everything looked OK (expected signal levels) except for the preamp.

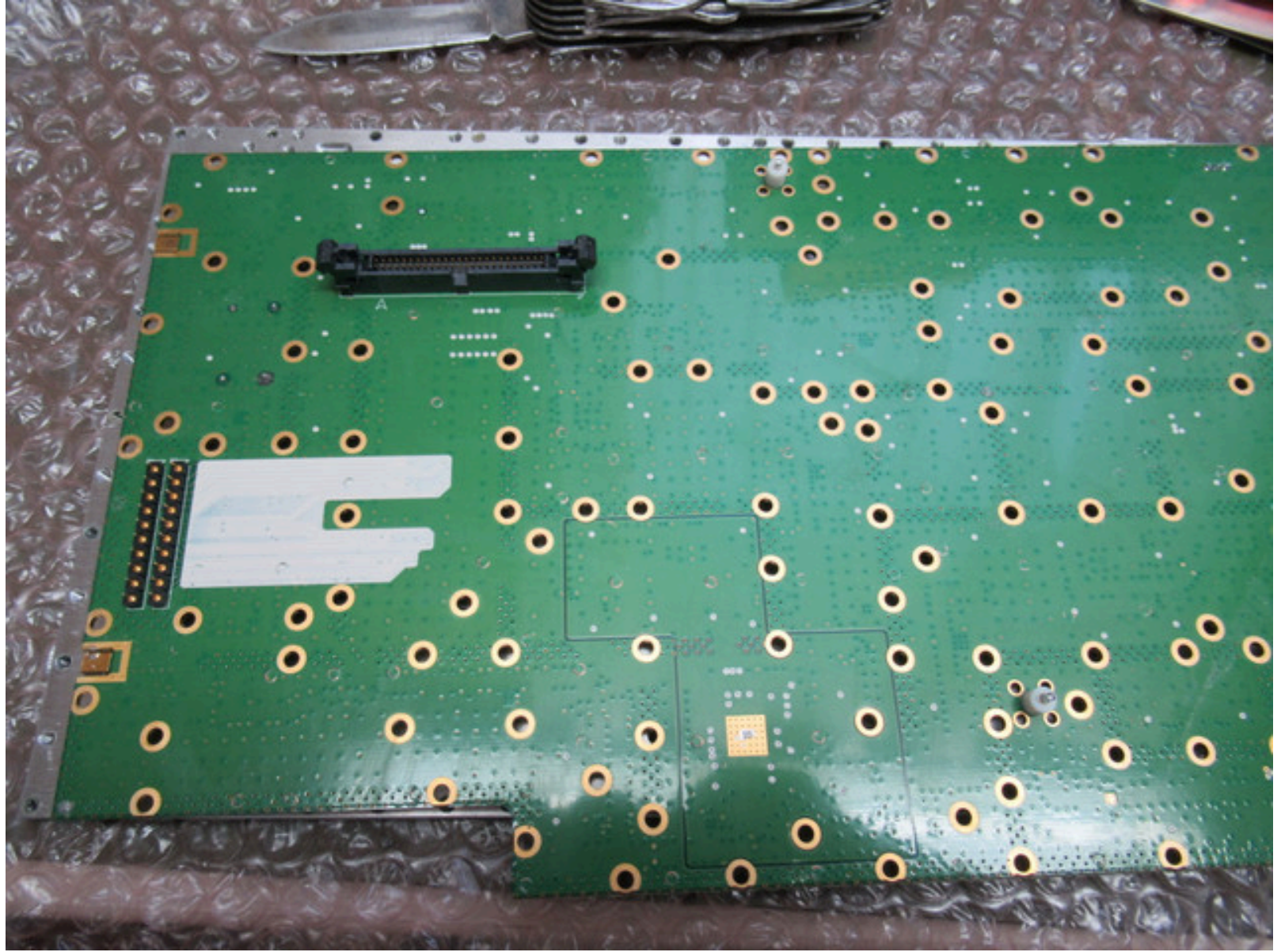
I managed to trace the control signals for the various RF switches back to the black connector which goes to the main board EXCEPT for the signal that controls the preamp. There is a preamp protection menu option in the settings menu so it could be possible the preamp isn't controlled from the mainboard but through a circuit that does some kind of level detection. However, I have not been able to spot such a circuit on the spectrum analysis board. As I mentioned before the spectrum analyser module consists of 2 boards. The signals to the main board are going to the 2nd (bottom) board which has the connector to the main board through a board-to-board connector. So it could be this circuitry resides on the 2nd board. Time to crack the spectrum analyser module open further and take the 2nd board out:

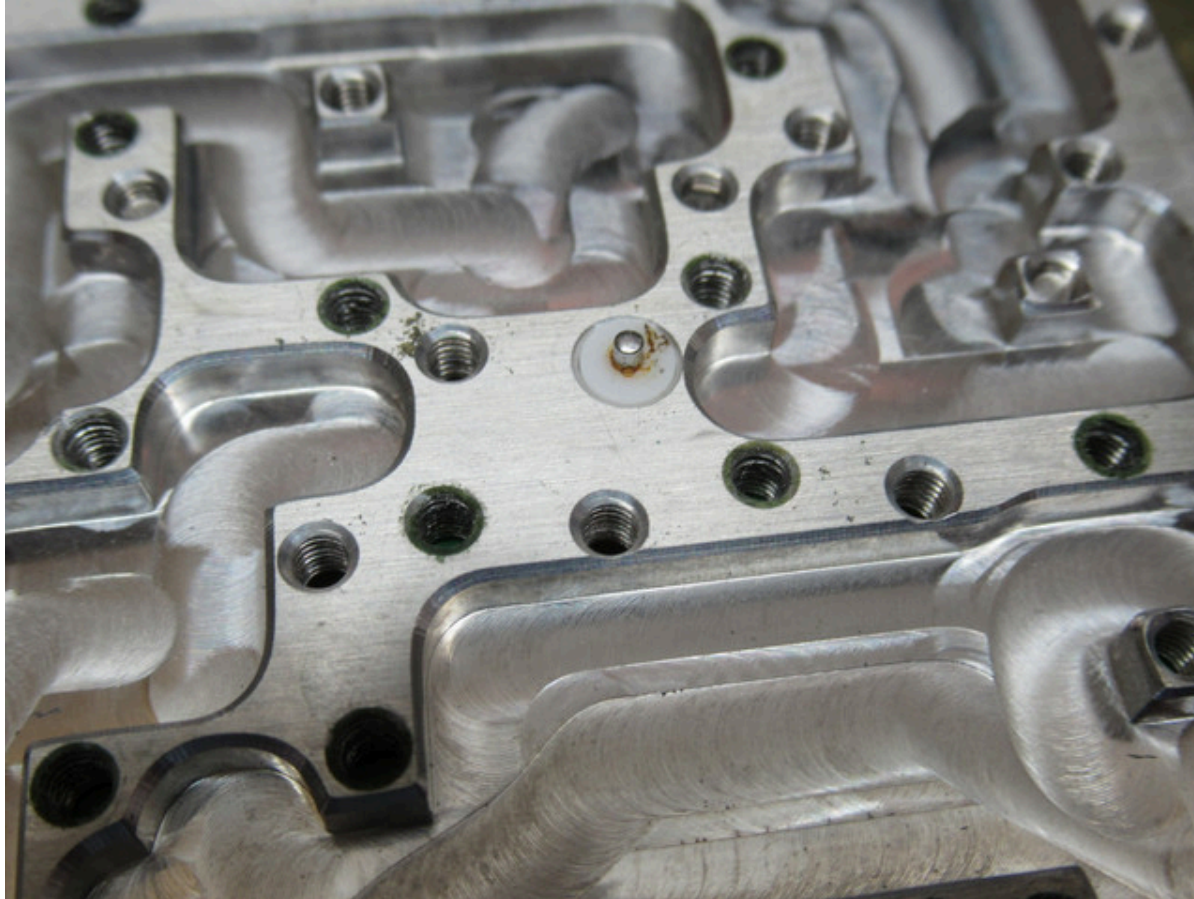
This has a whole bunch of clock synthesizers to make the various LO frequencies: it is the RF generator board. The signals are fed through 3 pins that are soldered in both boards so I had to desolder one side. The digital signals are transferred using a connector.









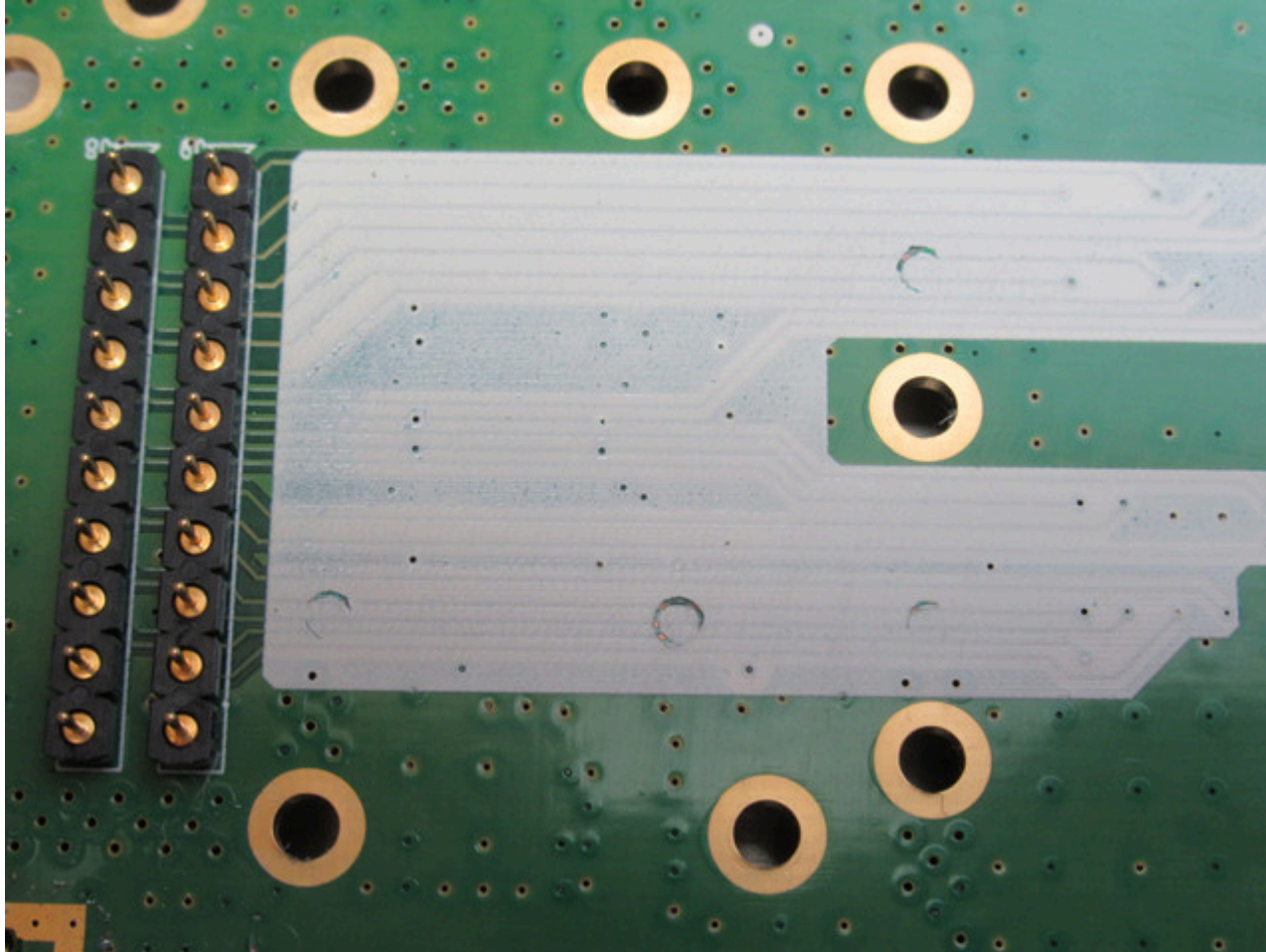


No sign of a circuit that controls the preamp and the signal from the connector to spectrum analysis board goes nowhere on the RF generator board. Hmmm.

Now remember I changed the screws... the original screws are 13mm long but the replacements I used are 14mm because 12mm was just too short to have a good grip.

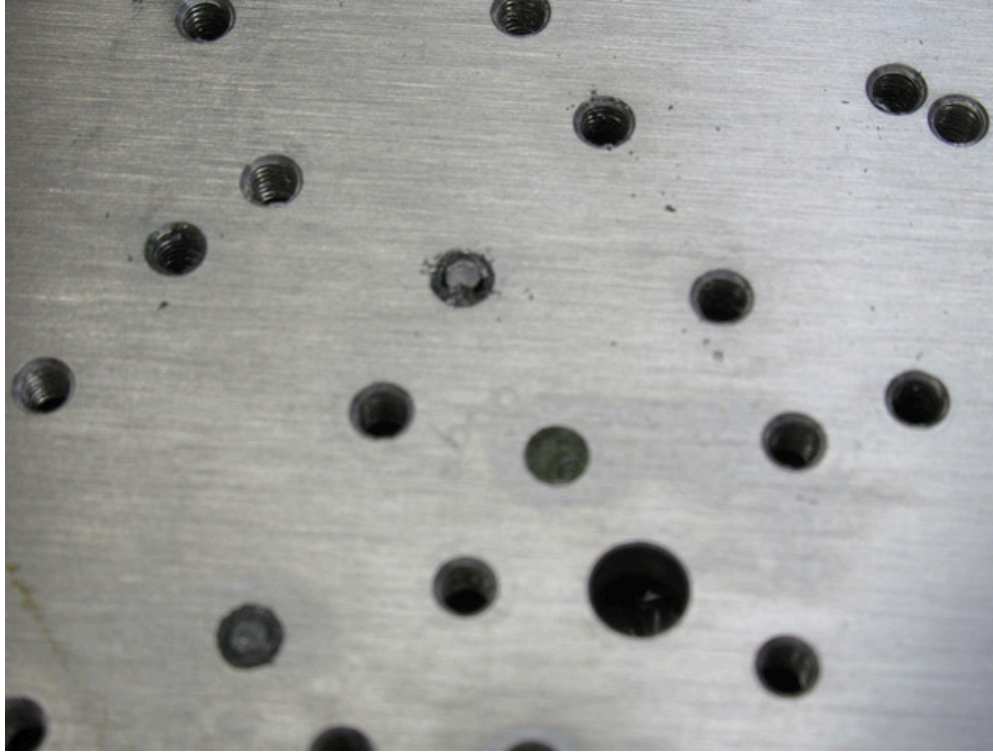
I was expecting the holes to be blind but they are not so I drove a few screws straight into some of the control signals on the RF generator board. Including the signal to control the preamp. So I fixed the preamp but broke it again in a different way 🤔  
What are the odds of doing that?



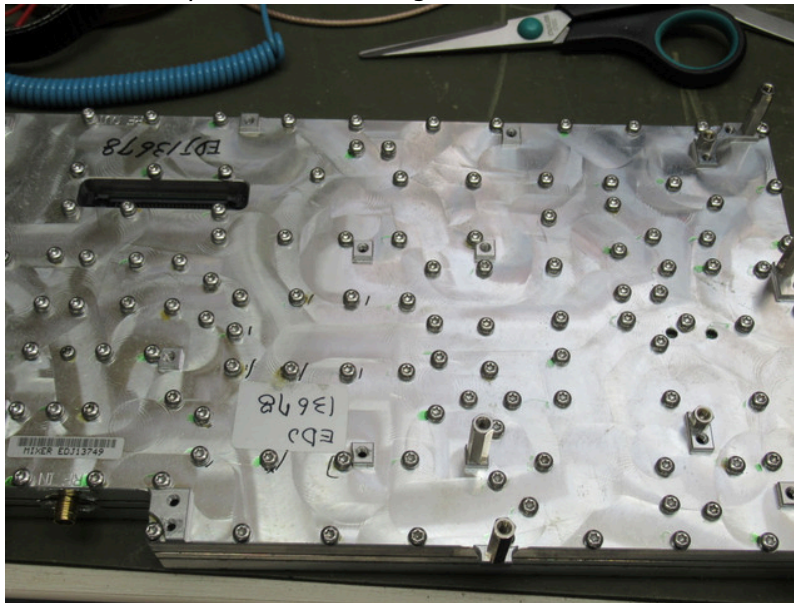


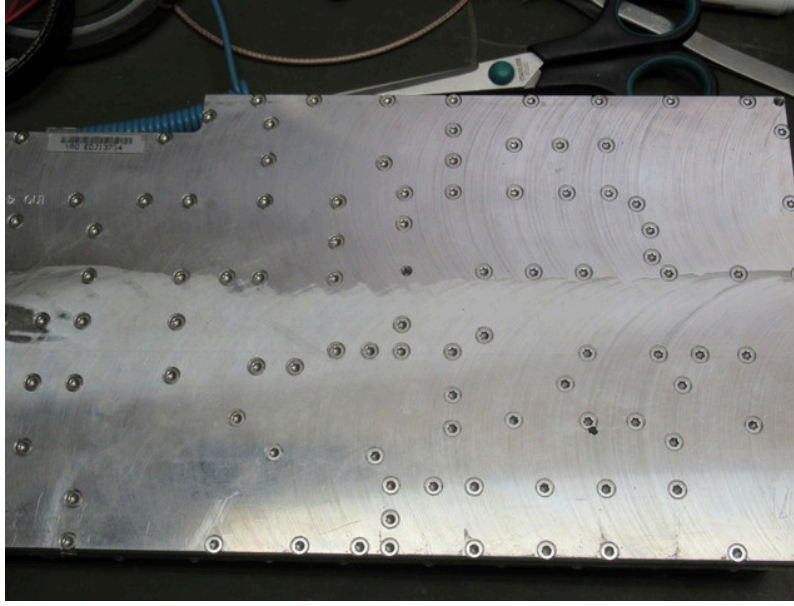
I fixed the traces and put some polyimide (kapton) tape over them for protection.

I also noticed that the middle aluminium block had quite a bit of debris on it so I gave that a clean as well:



Some 200+ screws later the spectrum analysis modules was back together again. This time with washers under the screws to make sure they don't hit the RF generator board.



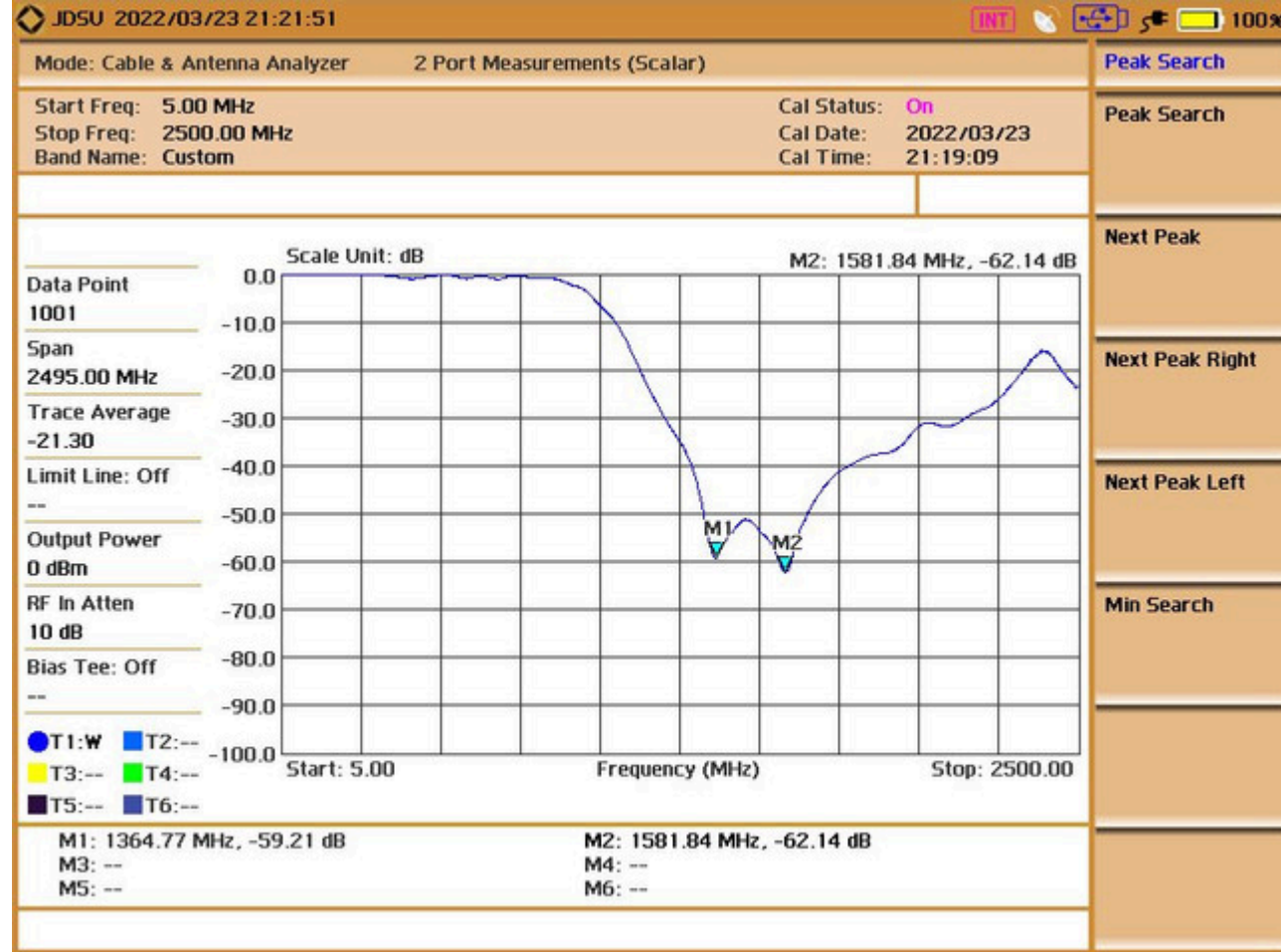


Yes, I also replaced the screws that hold the cover for the RF generator board with Torx but made sure these weren't too long.

Proof of the pudding:

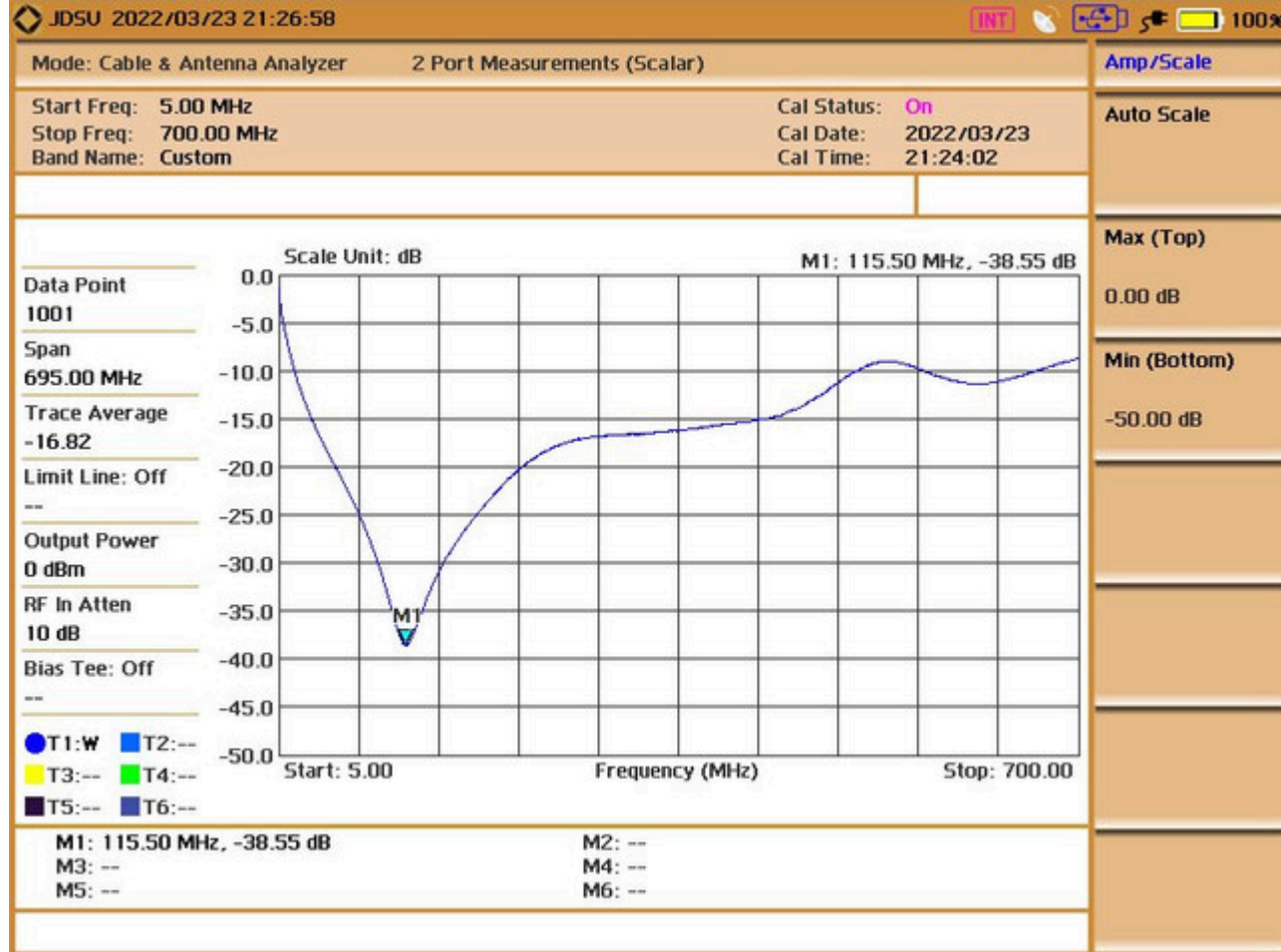
First a test of a microstripline filter I created many years ago:





In earlier measurements (with the broken preamp) using the scalar measurement, the part below -50dBm would drop down and reside at around -75dBm making the JD745A less usefull for these kind of measurements. The VNA could take over but this has less dynamic range and needs a more cumbersome calibration. Getting the preamp fixed really was important for useability.

And the impedance of a big 1nf surface mount capacitor:



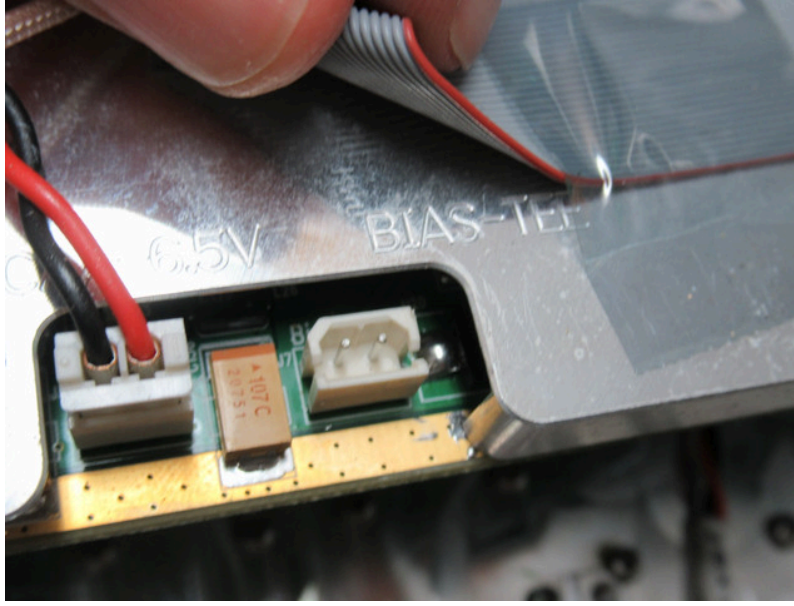
No, there is nothing wrong with the image saving. I tried the reverse color option which apparently reverses all colors and not just that of the trace area. A quick check at a couple of frequencies shows that the new preamp chip has about the same gain as the original one. The levels with / without preamp enabled are the same. I dreaded to mess with the calibration but it looks like that isn't necessary. I need to do further testing though to make sure.

A remaining issue is that the touchscreen doesn't seem to work for the function buttons but it turns out that the touchscreen is not enabled for those. The touchscreen is only used for using the onscreen keyboard (and maybe some other things that I have not investigated).

### Bias tee option

The JD745A has an option for a bias tee which be used to apply voltage on the RF input of the VNA. This would be handy to measure the impedance of capacitors at various DC voltages. It would be nice to get this to work somehow.

I found this connector on the VNA module:



Hmm. What can be done with this? The unit is so compact that there is no room for an external bias so my guess is that the BIAS tee is inside the VNA modules. Measuring on the connector revealed that one pin is ground and that there is a reverse polarity protection diode on this connector. I tried to apply voltage to this pin and turn the bias-tee on but this didn't work. I modified the license file to enable the bias tee but the option is still listed as 'not installed'. The menu item is accessible though but nothing happens. So either the hardware for the BIAS tee is missing or the license code must be valid. I have not investigated this further. I don't want to open the VNA module if I don't have to.

### **What can the JD754A do?**

According to the datasheet, the JD745A is quite versatile. After all it is a basestation analyser that is supposed to be able to do RF troubleshooting as well.

The spectrum analysis mode is pretty quick. Certainly usefull for doing EMC pre-compliance work and use as a general purpose spectrum analyser. In spectrum analysis mode the tracking generator can be freely set to a certain frequency and signal level (0dBm or between -50dBm to -30dBm) so it can be used as a CW (constant wave) generator as well. As expected the signal isn't very clean. When set at 500MHz, there is a 1 small harmonic at 1GHz but when set to 1.1GHz, there are a few strong harmonics.



Mode: Spectrum Analyzer

Dual Spectrum

BW/AVG

Center Frequency: 500.000 000 MHz

Preamp: Off

Freq Reference: Internal

RBW

Channel: -----

Attenuation: 30 dB [A]

Trigger Source: Internal

10 kHz

Channel Standard: Band 0 (800)

External Offset: 0.00 dB [On]

Trigger: Free Run

Auto

Manual

Mode

Sweep

Detector

RMS

RBW [M]

10 kHz

VBW [A]

10 kHz

Sweep Time

166.99 ms

Average : 1

1

T1:W

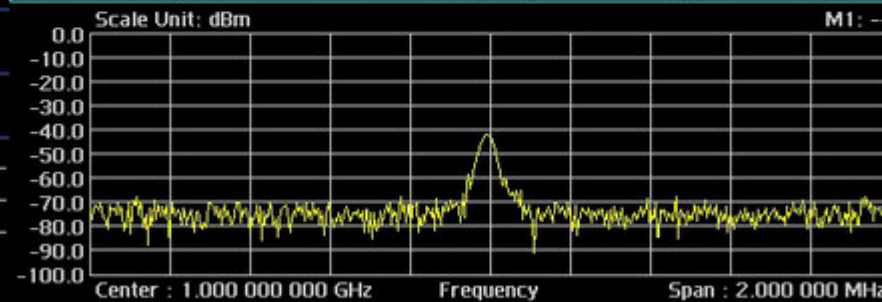
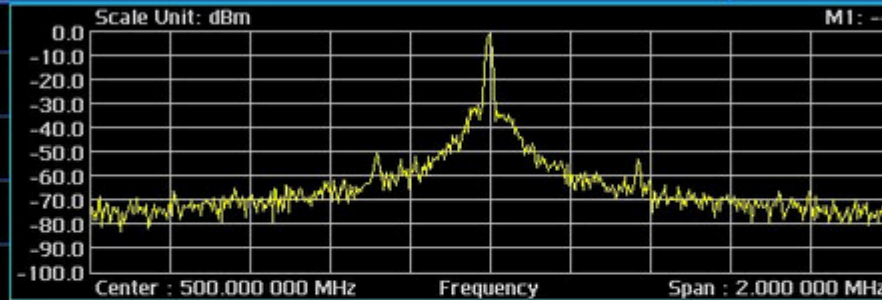
T2:--

T3:--

T4:--

T5:--

T6:--



M1: --

M2: --

M3: --

M4: --

M5: --

M6: --

VBW

10 kHz

Auto

Manual

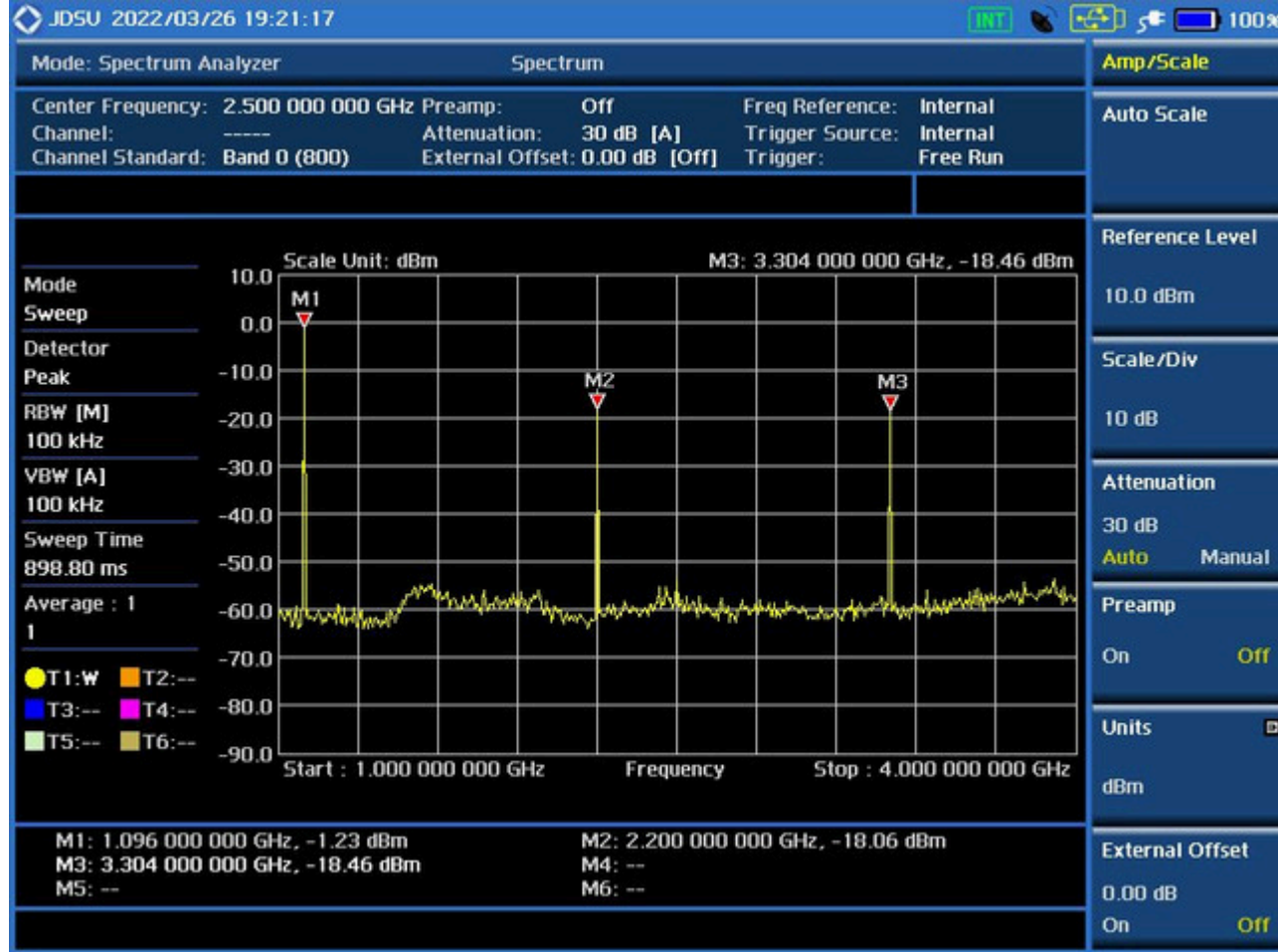
VBW/RBW

1 0.3 0.1

0.03 0.01 0.003

Average

1

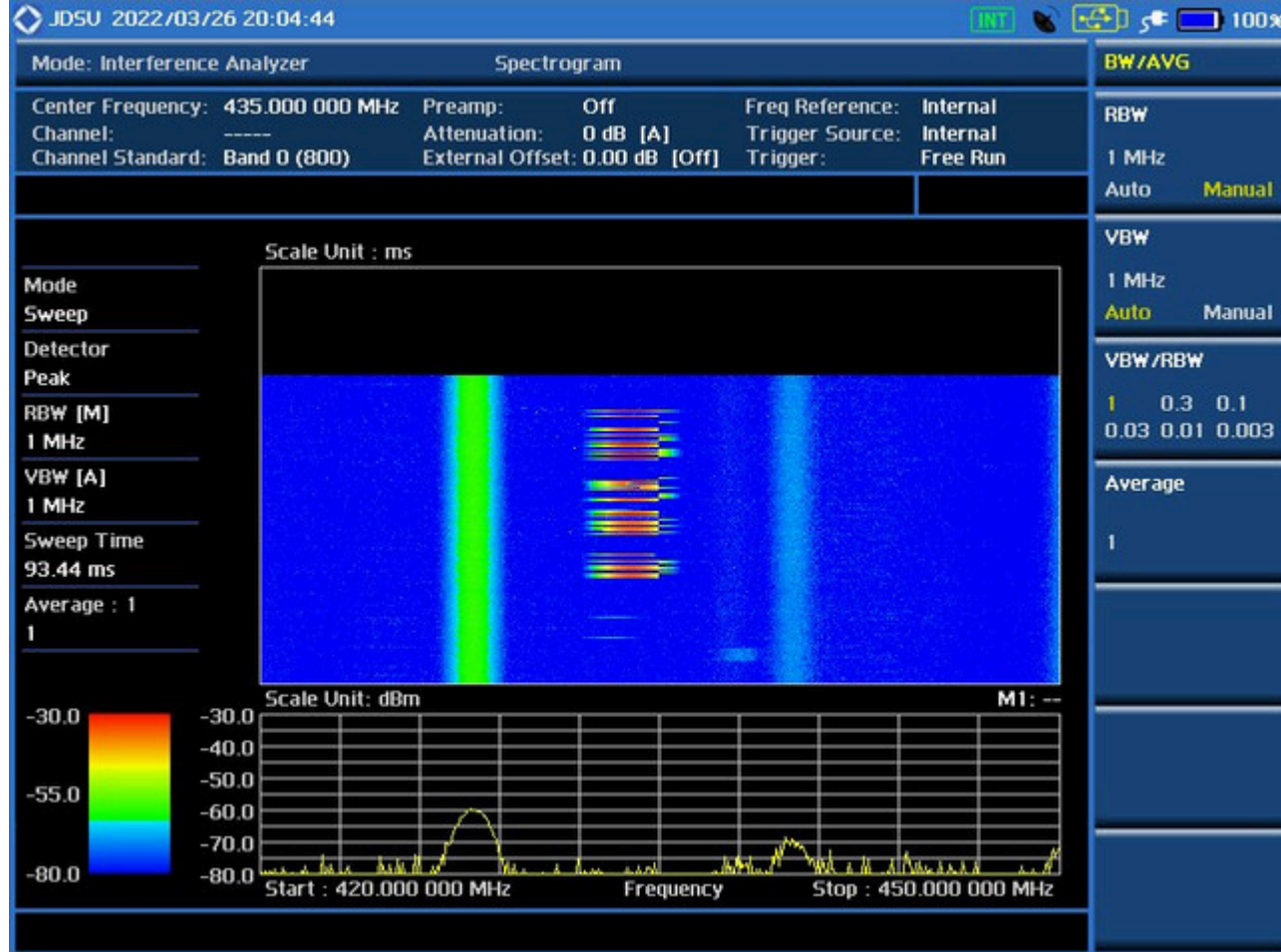


The VNA (antenna / cable analyser mode) can do both vector and scalar analysis. In vector analysis mode the VNA input is used and measurements have a dynamic range of 60dB. In vector mode an OSLT (open, short, load -50 Ohm- and through) calibration is required. In scalar mode a through calibration is sufficient. It is also possible to show a Smith chart but unfortunately this doesn't have an inductance / capacitance marker.

I took some measurement from a 1uf 0402 and a 100nf 0402 capacitor using the PCB design made available by oz2cpu (see <https://www.eevblog.com/forum/projects/component-tester-board-for-sa-na-impedance-caps-inductors-filters/> )







Less usefull are the various 3G/4G signal analysis options. My unit also has the E1/T1 analysis module installed but it has been ages since I have come across such an interface.

Last but not least, the JD745A has a built-in GPSDO using a uBlox module and a decent OCXO. No 10MHz and 1PPS output though but these should be easy enough to add if you want.

All in all I think the JD745A is a good buy for the money. Maybe even a replacement for my higher end Advantest spectrum analyser but let's see how it holds up for some real world use.

Logged

There are small lies, big lies and then there is what is on the screen of your oscilloscope.

The following users thanked this post: egonotto, thm\_w, tv84, Qw3rtzuiop, TheSteve, DaneLaw, ch\_scr, jmw



Posts: 28653

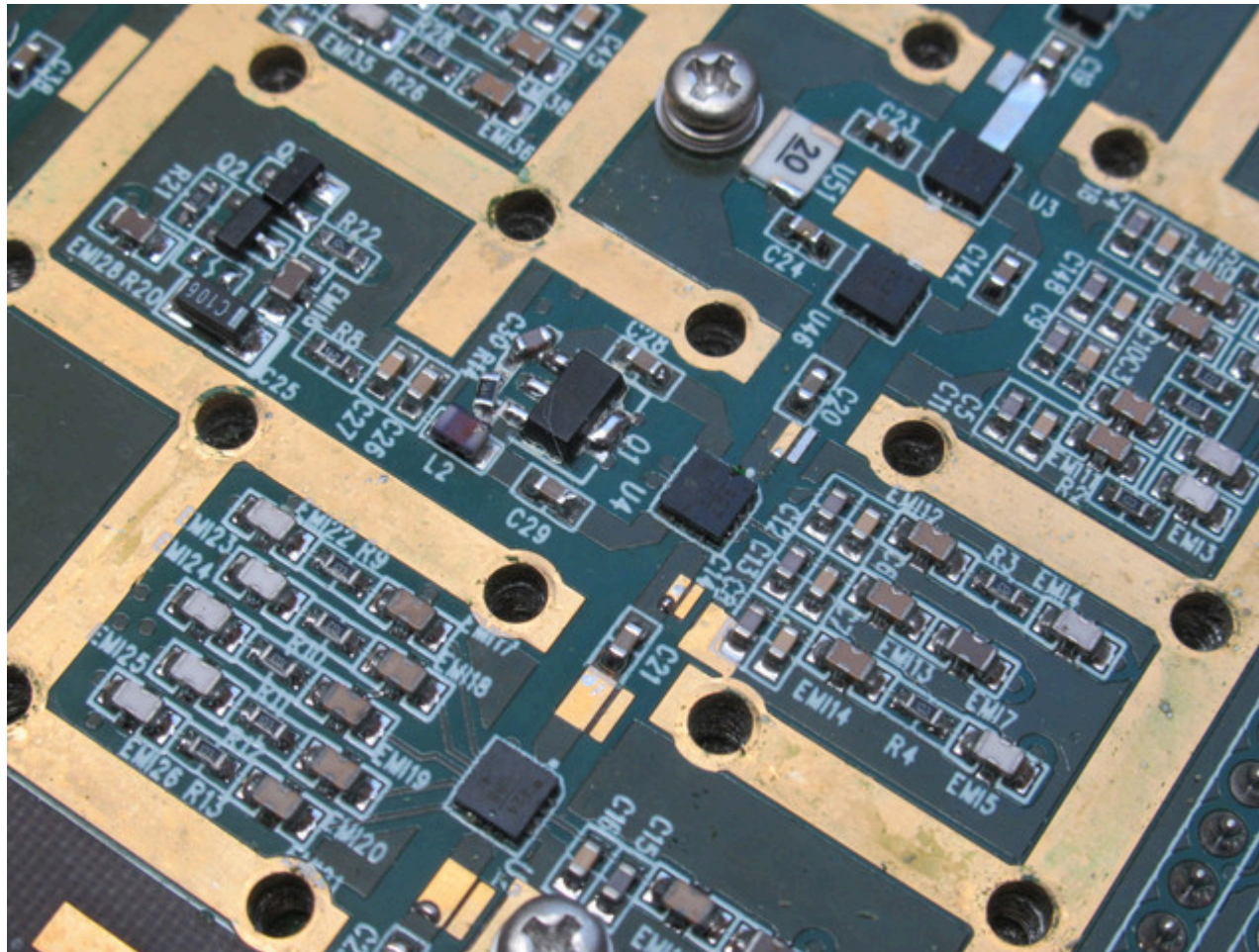
Country:



And it seems the preamp is broken again... 🤖 to be continued...

After taking it apart and re-assembling the unit two more times (including undoing all the screws of the top part of the spectrum analyser module) I think I have fixed it.

This time I powered the spectrum analyser module outside the unit by feeding it 5.1V from a power supply and use a signal generator and oscilloscope to trace the signal. The control signals from the CPU board towards the RF switches are simple to access in order to control them.



It turned out that the RF switch U4 (HMC472) was the culprit. At the first retry it looked like it shorted all RF ports. The solder joints looked a bit dodgy as well. I tried to resolder it using a tip with a sharp edge that usually works well for QFN. That made the JD745A work for about half an hour but then the problem returned.

At the second repair I noticed that the exact same problem has occurred. When I pressed a probe on one of the select pins (on the package itself) that control the RF switch, it suddenly started to work but flexing the board could make it stop working.

This time I used hot air to take the chip (U4) off entirely and resolder it completely. As a good measure I also reflowed RF switches U3 and U46 because the solder joints on those didn't look very well either.

I hope this finally fixes the problem. If not, then I'm afraid there is some kind of internal damage inside U4 (HMC427). Actually I would have liked to replace it to make sure but it is not available anywhere.

« Last Edit: March 31, 2022, 03:46:55 pm by nctnico »

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 **nctnico** 

Super Contributor



Posts: 28653

Country: 



 **Re: JDSU J745A spectrum analyser / VNA repair & mini review**

« **Reply #2 on:** March 31, 2022, 08:45:39 pm »

After a bit of playing with it, it turns out that the device has a SCPI interface over the network as well on port 66. It can be enabled in the LAN section of the system menu. Sending \*IDN? works but I have not been able to find a command reference though.

 Logged

There are small lies, big lies and then there is what is on the screen of your oscilloscope.

☐ **Qw3rtzuiop**

Regular Contributor



Posts: 244

Country: 

 **Re: JDSU J745A spectrum analyser / VNA repair & mini review**

« **Reply #3 on:** April 01, 2022, 12:15:35 pm »

The bias option is an additional small pcb. Take a look at the overview of the pcbs here:

<https://www.eevblog.com/forum/repair/jdsu-jd745a-base-station-analyzer-repair-log/msg2993802/#msg2993802>

I can take a few pictures if you want.

 Logged

 **nctnico** 

Super Contributor



Posts: 28653

Country: 



 **Re: JDSU J745A spectrum analyser / VNA repair & mini review**

« **Reply #4 on:** April 01, 2022, 01:35:36 pm »

**Quote from: Qw3rtzuiop on April 01, 2022, 12:15:35 pm**

The bias option is an additional small pcb. Take a look at the overview of the pcbs here:

<https://www.eevblog.com/forum/repair/jdsu-jd745a-base-station-analyzer-repair-log/msg2993802/#msg2993802>

I can take a few pictures if you want.



I did look through that thread very carefully but I have not been able to spot the bias option PCB though. I'd be very grateful if you can share some pictures of that board; I'm very curious whether this is easy to add or not.

BTW: do you still need a calibration file?

« Last Edit: April 01, 2022, 02:00:50 pm by nctnico »

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There are small lies, big lies and then there is what is on the screen of your oscilloscope.

 **Qw3rtzuiop**

Regular Contributor



Posts: 244

Country: 

 **Re: JDSU J745A spectrum analyser / VNA repair & mini review**

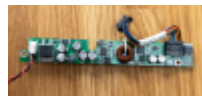
« **Reply #5 on:** April 01, 2022, 02:32:26 pm »


**Quote from: nctnico on April 01, 2022, 01:35:36 pm**

BTW: do you still need a calibration file?


No thanks i got one.

There are no pictures in that thread but i included the bias unit in the block diagram in the first post. It looks like this. Probably not that easy to clone.



 IMG\_1166.jpg (2372.44 kB, 5544x2504 - viewed 399 times.)



 IMG\_1171.jpg (2164.58 kB, 5624x2232 - viewed 274 times.)

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 **nctnico** 

Super Contributor



Posts: 28653

Country: 



 **Re: JDSU J745A spectrum analyser / VNA repair & mini review**

« **Reply #6 on:** April 01, 2022, 02:42:29 pm »

That is more than I expected indeed. It looks like it is a power supply to generate the bias voltage. A big question mark is whether the VNA units differ (bias tee fitted as standard or not).

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There are small lies, big lies and then there is what is on the screen of your oscilloscope.

☐ **Qw3rtzuiop**

Regular Contributor



Posts: 244

Country:

☐ **giovannirat**

Regular Contributor



Posts: 118

Country:



## Re: JDSU J745A spectrum analyser / VNA repair & mini review

« **Reply #7 on:** April 01, 2022, 03:25:25 pm »

I've seen two units. My unit was equipped with the bias unit and the other one I've seen wasn't.

Logged



## Re: JDSU J745A spectrum analyser / VNA repair & mini review

« **Reply #8 on:** July 30, 2022, 07:12:18 pm »

I managed to by a JD785A.

I would appreciate any answer to my questions below:

1) Backup

**Quote from: nctnico on March 27, 2022, 06:27:36 pm**

The first link also contains information about getting into the Linux system. That allowed me to make dumps of the flash memory onto a USB stick so I have a backup of the entire flash.

A backup is always a good idea. @nctnico: Can you give me a step by step instruction how to make dumps of the flash memory onto USB stick? Thank you very much!

2) SW update

My unit has an outdated SW release 3.050.040 (.. I believe). The latest update of JD740B/JD780A/JD780B series FW on [updatemyunit.net](http://updatemyunit.net) is release 3.120.043.

I did not completely understand what the sentence "The following table lists the versions of related VIAVI hardware and/or software that can be used in

conjunction with this release for CellAdvisor JD780A, JD780B, and JD740B series analyzers." in the release notes means....

In short: I have the following firmware ( and DSP versions) on my unit. Is it possible to update directly to the latest release or are some SW/HW prerequisites not fulfilled ?



IMG\_20220729\_144526328\_.jpg (751.46 kB, 1600x1200 - viewed 261 times.)

Logged

 **nctnico** 

Super Contributor



Posts: 28653

Country: 



### **Re: JDSU J745A spectrum analyser / VNA repair & mini review**

« **Reply #9 on:** July 30, 2022, 08:40:11 pm »

You need to download the 740**A** firmware.

To dump the firmware onto a USB stick you'll need to login as root onto the unit and copy all the files using the Unix cp command onto the USB stick.

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There are small lies, big lies and then there is what is on the screen of your oscilloscope.

☐ **giovannirat**

Regular Contributor



Posts: 118

Country: 

### **Re: JDSU J745A spectrum analyser / VNA repair & mini review**

« **Reply #10 on:** July 30, 2022, 08:58:39 pm »

Hi nctnico,

thank you very much!

**Quote from: nctnico on July 30, 2022, 08:40:11 pm**

You need to download the 740**A** firmware.

My unit is a JD785A. From my understanding it should fall in this category "JD740B/**JD780A**/JD780B ? Or I'm wrong?

Logged

 **nctnico** 

Super Contributor



### **Re: JDSU J745A spectrum analyser / VNA repair & mini review**

« **Reply #11 on:** July 30, 2022, 09:11:40 pm »





Posts: 28653

Country:



☐ **giovannirat**

Regular Contributor



Posts: 118

Country:

☐ **giovannirat**

Regular Contributor



Posts: 118

Country:

☐ **ferorted**

Newbie

Posts: 3

Country:

I missed that. AFAIK the 785A falls into the 780A category indeed

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There are small lies, big lies and then there is what is on the screen of your oscilloscope.



### Re: JDSU J745A spectrum analyser / VNA repair & mini review

« **Reply #12 on:** July 30, 2022, 09:19:54 pm »

So I'm still not sure if I can update from my current release directly to the latest release ?

The last thing I want is a bricked device....

Any suggestions from your experience?

Thank you very much

Logged



### Re: JDSU J745A spectrum analyser / VNA repair & mini review

« **Reply #13 on:** August 05, 2022, 07:37:07 pm »

Viavi technical support was very responsive.

Update to the newest release can be done, there are no dependencies.

In fact update was flawlessly, no problems..

Logged

**The following users thanked this post:** nctnico




### Re: JDSU J745A spectrum analyser / VNA repair & mini review

« **Reply #14 on:** November 17, 2022, 01:34:37 pm »

Hello nctnico,  
I am interested in your comments about the JDSU JD745A, because I am hesitating to buy this equipment (used) or an Owon XSA1036-TG (new).  
My main (but not only) purpose is to use it to check gain, power and frequency response of RF amplifiers (Mobile Signal Repeaters)

I would like to know your opinion on which one is better for that and its pros & cons.  
Thank you

 Logged

 **nctnico** 

Super Contributor



Posts: 28653

Country: 



### **Re: JDSU J745A spectrum analyser / VNA repair & mini review**


« **Reply #15 on:** November 18, 2022, 11:26:43 am »

For the money Owon is asking I'd look somewhere else. Owon does not have a good reputation where it comes to firmware.

Also, a spectrum analyser + tracking generator is of limited use for measuring RF devices. If you go on Ebay you'll notice that only a few spectrum analysers for sale have a tracking generator. That is because a network analyser is the tool of choice for measuring RF devices because it can also measure phase (which then allows to plot things like a Smit chart). The J745A has limited VNA functionality. It can do a Smith chart but it does not have a way to measure inductance / capacitance and the VNA (vector) and scalar measurements start at 5MHz. It does have a suite with mobile testing features so if you are into that, it can do a lot of analysis (including time synchronisation of cell towers). On top of that the J745A also has a good spectrum analyser module inside. All in all it is a nice instrument even though the software can be a bit quirky at times.

If you want to have more/better VNA style features, you should take a look at the LibreVNA device which is priced in the 800 euro ball-park. I'd skip the NanoVNA. I have one myself but it is too cumbersome to use and there are so many different (bad) versions out there that it is very difficult to find the right one and the dynamic range is also very limited.

« *Last Edit:* November 18, 2022, 11:28:48 am by nctnico »

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There are small lies, big lies and then there is what is on the screen of your oscilloscope.

 **ferorted**

Newbie

Posts: 3

Country: 

### **Re: JDSU J745A spectrum analyser / VNA repair & mini review**

« **Reply #16 on:** November 18, 2022, 01:36:07 pm »

Thank you very much for your reply.

For my usual measurements Spectrum Analyzer + Tracking Generator (SA+TG) is enough.

That's why I was asking about J745A as SA+TG.

I don't really need all the features of a VNA, although it would be nice to have them, but only if it doesn't complicate my main measurements (SA+TG).

How do you think about the J745A as a spectrum analyzer + tracking generator? it' has a simple way of use? or better, I look for a standard SA+TG.

I am also going to look at the LibreVNA .

« *Last Edit:* November 21, 2022, 07:30:29 pm by ferorted »

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 **nctnico** 

### **Re: JDSU J745A spectrum analyser / VNA repair & mini review**



Posts: 28653

Country:



I have been trying to get the remote control going a bit. Unfortunately I have not been able to find a remote programming reference for the J745A but I have been using these documents from a newer device as inspiration:

[https://celladvisor.updatemyunit.net/archives/CAA06M\\_CAA\\_Programming\\_Guide\\_R1.0.pdf](https://celladvisor.updatemyunit.net/archives/CAA06M_CAA_Programming_Guide_R1.0.pdf)

[https://celladvisor.updatemyunit.net/archives/CellAdvisor5G\\_Programming\\_Guide\\_R8.1.pdf](https://celladvisor.updatemyunit.net/archives/CellAdvisor5G_Programming_Guide_R8.1.pdf)

With some trial & error I have found the commands below to work when connected using telnet to port 66 or by using PyVisa:

JDSU SCPI commands

Telnet port 66

#RBW setting

SPEC:RBW 100 kHz

#Spectrum analyser frequency settings

SPEC:FREQ:STAR 150 kHz

SPEC:FREQ:STOP 200 MHz

#set attenuator

SPEC:AMPL:ATTE?

SPEC:AMPL:ATTE 0 dB

#select trace

SPEC:TRAC:SEL?

SPEC:TRAC:SEL T2

SPEC:TRAC:SEL T1

#get sweep time (in milli-seconds)

SPEC:SWEEP:TIME?

#trace mode (capture, write, max hold, min hold, view on/off

SPEC:TRAC:CAP

SPEC:TRAC:CLE

SPEC:TRAC:MAX

SPEC:TRAC:MIN

SPEC:TRAC:VIEW?

SPEC:TRAC:VIEW OFF

SPEC:TRAC:VIEW ON

#Set averages



SPEC:AVG?

SPEC:AVG 5

#set trace detector

SPEC:TRAC:DET RMS

#read trace data (appears to be always in dBm regardless of screen unit)

SPEC:TRAC:DATA?

#Reference level

SPEC:AMPL:REF?

SPEC:AMPL:REF -30

#Set units

SPEC:AMPL:UNIT?

SPEC:AMPL:UNIT dBuV

SPEC:AMPL:UNIT dBm

#set scale (units per div)

SPEC:AMPL:DIV 20

SPEC:AMPL:DIV 5

####Cable analyser

#frequency start / stop

CAA:FREQ:STAR 10 MHz

CAA:FREQ:STAR 5 MHz

#CAA trace (counts from 0 to 5)

CAA:TRAC:SEL 0

CAA:TRAC:CAP

CAA:TRAC:CLE 0

CAA:TRAC:VIEW 1


CAA:TRAC:VIEW 0

#Get data

CAA:TRAC:DATA?

For now I know enough to use it remotely for spectrum analysis tasks. I still would like to be able to switch the J745A between various modes (or at least set it to spectrum analyser mode). At this point the best way forward would be to install the remote control software and see which commands are exchanged between the devices.

I have attached a text file with what seems to be all the SCPI tokens that de J745A can use. These tokens appear to be different at some places compared to the documents I linked to above.

 [scpi.txt](#) (4.17 kB - downloaded 102 times.)

« Last Edit: November 25, 2022, 07:34:43 pm by nctnico »

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The following users thanked this post: Qw3rtzuiop, Hydron, amirrezam

 **ag4zp**

Newbie

Posts: 4

Country: 

 **Re: JDSU J745A spectrum analyser / VNA repair & mini review**

« Reply #18 on: May 01, 2023, 04:22:44 pm »

Did you need to change any settings to enable SCPI commands on port 66? My GC747A allows me to connect to port 66 but does not respond to any commands (e.g., even basic ones like \*IDN?).

Also, tangentially related, have you heard of any efforts to reverse engineer the trace file format? I would love to be able to retrieve S-parameters with these units.

 Logged

 **Tiberius1**

Newbie

Posts: 4

Country: 

 **Re: JDSU J745A spectrum analyser / VNA repair & mini review**

« Reply #19 on: July 15, 2023, 11:59:43 pm »

Hi

Did you fix the intermittent spec analyzer input issue using the reflow method?

I have the same issue when touching that area the input will fail or high attenuation.

Looking at reflow as a possible fix

Thanks in advance

 Logged

 **Tiberius1**

Newbie

Posts: 4

Country: 

 **Re: JDSU J745A spectrum analyser / VNA repair & mini review**

« Reply #20 on: July 22, 2023, 06:12:36 am »

Update to previous post.

2 attempts to reflow . 1st attempt failed . 2nd attempt good. Use a good magnifying glass 10x or better to check for good solder between cct board pads and the 2 Rf switch ics just before the 20db attenuator. The soldering around these 2 ic's is the reason for intermittent issues around input signal level.

 Logged

 **Hydron**

Super Contributor



Posts: 1125

Country:

☐ **FlexibleMammoth**

Regular Contributor



Posts: 72

Country:

☐ **Gri**

Newbie

Posts: 2

Country:



### Re: JDSU J745A spectrum analyser / VNA repair & mini review

« **Reply #21 on:** July 25, 2023, 02:36:40 pm »

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**Quote from: ag4zp on May 01, 2023, 04:22:44 pm**

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Did you need to change any settings to enable SCPI commands on port 66? My GC747A allows me to connect to port 66 but does not respond to any commands (e.g., even basic ones like \*IDN?).

Also, tangentially related, have you heard of any efforts to reverse engineer the trace file format? I would love to be able to retrieve S-parameters with these units.

---

Using telnet to talk SCPI on port 66 works on mine, there is a setting in the System->LAN menu (page 2) to set "App Interface" - I selected SCPI (though I didn't try the other settings).

Logged



### Re: JDSU J745A spectrum analyser / VNA repair & mini review

« **Reply #22 on:** August 03, 2023, 09:48:42 pm »

Hi all,

I also got my hands on a JD785A.

Did anyone manage to get root on a JD785A, JD745B or JD785B (possibly others from that time)?

JDSU/VIAVI changed the firmware recovery mechanism and the USB script trick from the 745A no longer works. Instead, fw recovery are 2 identical Linux ELFs, plus one system archive with .ko files inside.

Firmware is different yet again, one huge blob with MySQL stuff inside.

The newest 5G devices are different yet again, so no inspiration from there.

BR Andreas

Logged



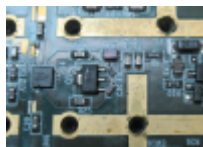
### Re: JDSU J745A spectrum analyser / VNA repair & mini review

« **Reply #23 on:** October 23, 2023, 03:10:24 pm »

---

Would you happen to know the values of the capacitors C29 and C30 as well as R14 in the preamp circuit? It looks like your photo shows a 551 on the resistor but want to confirm as the chip data sheet seems to suggest a lower value for biasing. I'm working through repairing one now that's been screwed with by someone before and is missing components, hoping I can bring her back to life.





Screen Shot 2023-10-23 at 11.07.17 AM.jpg (724.25 kB, 1596x1120 - viewed 148 times.)

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Super Contributor



Posts: 28653


Country: 



### **Re: JDSU J745A spectrum analyser / VNA repair & mini review**

« **Reply #24 on:** October 23, 2023, 03:23:18 pm »

C30 and R14 are some kind of feedback circuit. Likely to flatten the frequency characteristic. The bias resistor for Q1 is R8. Unfortunately I don't know the capacitor values. For C29 100nf will likely work fine.

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