
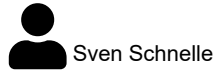



[Mute This Topic \(https://groups.io/g/HP-Agilent-Keysight-equipment/ft/91968578?csrf=5513314409256117711&mute=1&p=Created%2C%2C%2C20%2C2%2C0%2C0\)](https://groups.io/g/HP-Agilent-Keysight-equipment/ft/91968578?csrf=5513314409256117711&mute=1&p=Created%2C%2C%2C20%2C2%2C0%2C0)E4407B LO unlockDate  (<https://groups.io/g/HP-Agilent-Keysight-equipment/topic/91968578?p=Created%2C%2C%2C20%2C2%2C0%2C0>)Jun 24  (<https://groups.io/g/HP-Agilent-Keysight-equipment/message/127404>)

Hi List,

yet another thing that i bought. An E4407B ESA-E Spectrum Analyzer with 'LO unlock' error. Without a RF signal i see a Peak at ~860MHz. Looking inside, i see the LO signal going into U302, but no signal coming out of it. Just connecting the 50 Ohm Input of another Spectrum Analyzer to the PS_LO testpoint switches the state of the LO unlock LEDs on the Board. So i suspect that this chip is broken. Typing 1gc1-4210 into google showed a lot of results which say '12GHz multi modulus divider'.

Leo Bodnar even built a replacement module, but he states that this is only tested in ESG signal generators.

ebay even shows up several results of these chips, but they are usually very expensive. Does anyone know how to confirm that this chip is defective? I'm assuming the PS_LO testpoint is the output signal of the divider can someone confirm this? I also don't know which pins are supply voltages and other control signals. I appreciate any bit of information about this chip.

I'm afraid of spending a lot of money and it turns out that something is broken.

Thanks,
Sven

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hardyhansendk

Jun 24  (<https://groups.io/g/HP-Agilent-Keysight-equipment/message/127408>)

Hi Sven

It might be described here by signal path--many units suffer from this.

<https://youtu.be/gb1QMJtwumQ> (<https://youtu.be/gb1QMJtwumQ>)

Hardy

-----Oprindeligt meddelelse-----

Fra: HP-Agilent-Keysight-equipment@groups.io

[mailto:HP-Agilent-Keysight-equipment@groups.io] På vegne af Sven Schnelle

Sendt: 24. juni 2022 18:38

Til: HP-Agilent-Keysight-equipment@groups.io

Emne: [HP-Agilent-Keysight-equipment] E4407B LO unlock

Hi List,

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Sven

--

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Sven Schnelle

Jun 24  (<https://groups.io/g/HP-Agilent-Keysight-equipment/message/127414>)

Hi Hardy,

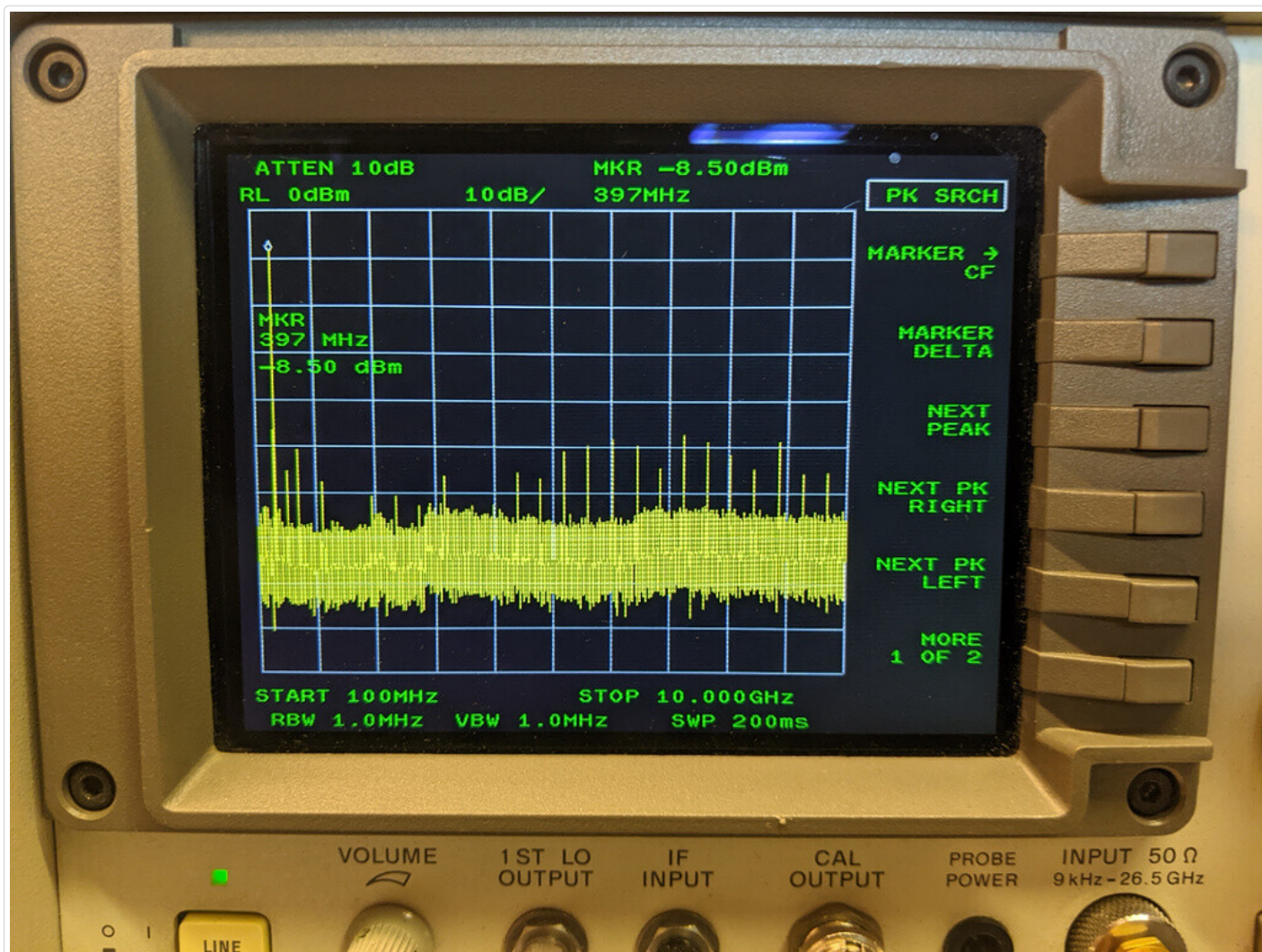
Yes, that's a great video from Shahriar. I already watched it. But his version has an 8 pin divider, while my board seems to be much newer (the SA seems to be built in 2016, according to date codes on the chips. It also has less discrete components, but two Xilinx CPLDs). My version has a 16 pin SSOP divider. But looking again, I'm not so sure that this chip is the problem - I measured the output with another SA and a scope, and it doesn't look so bad. It produces a 400Mhz signal with ~-9dBm with double loading by the other SA. I'm attaching the pictures here, but i think the

signals are ok. The input to the PLL Phase detector is looking similar to Shahriar's video - maybe something in the fractional divider between the divider and the phase detector is wrong.

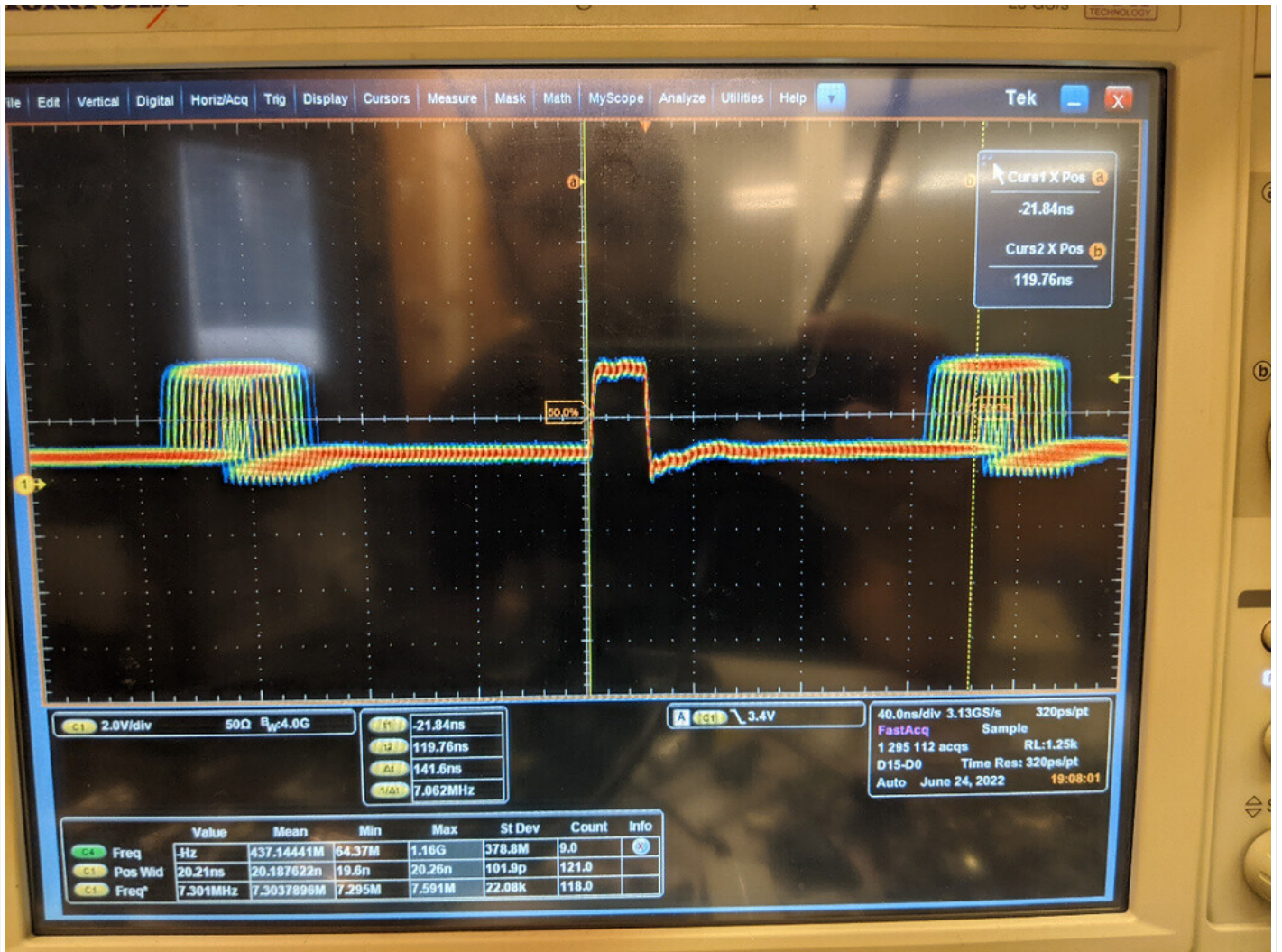
Has anyone seen a CLIP for these units? Shahriar seems to have one, but I guess they are not public?

Thanks,
Sven

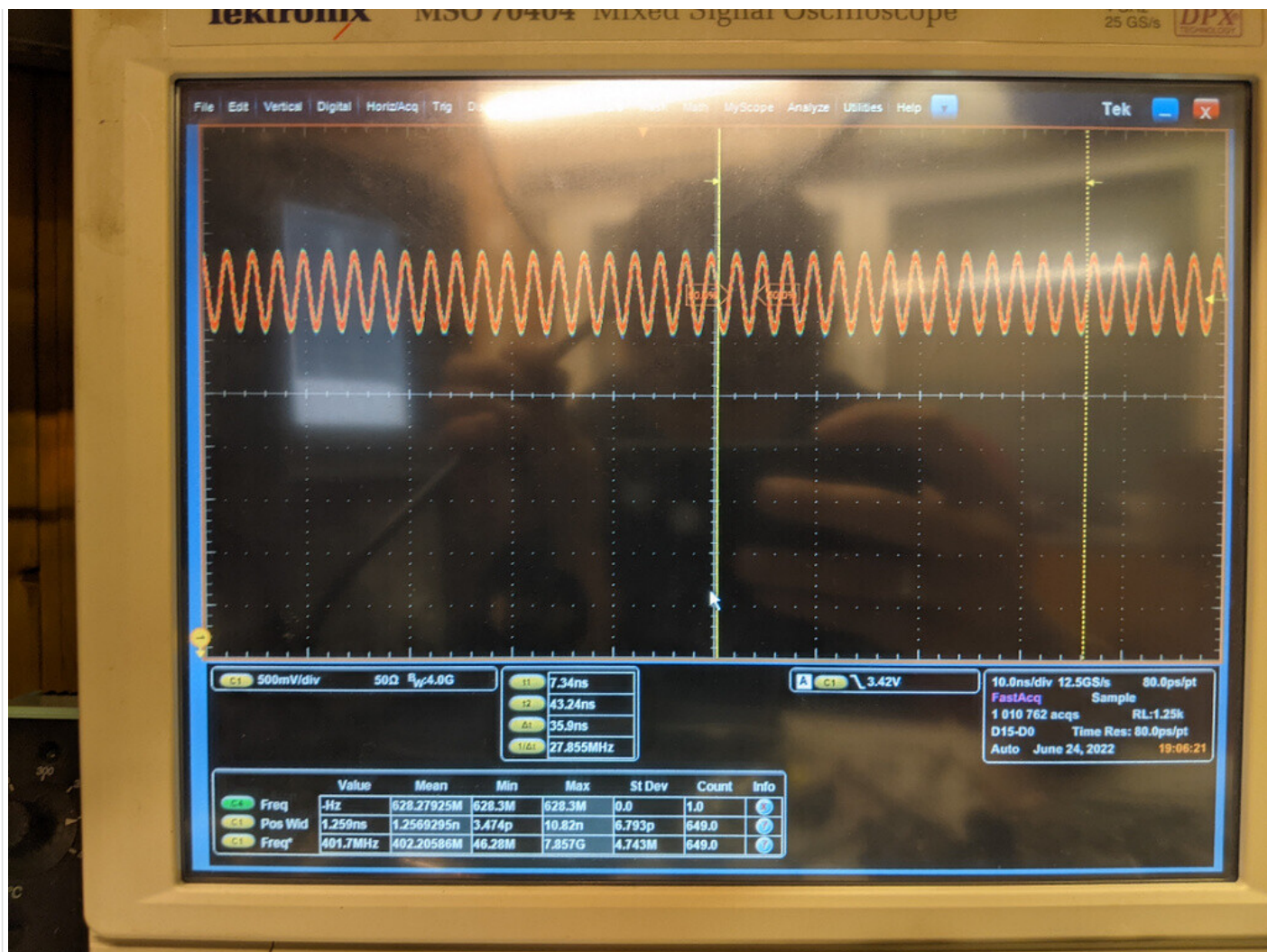
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(<https://groups.io/g/HP-Agilent-Keysight-equipment/attachment/127414/0/pic1.jpg>)



(<https://groups.io/g/HP-Agilent-Keysight-equipment/attachment/127414/1/pic3.jpg>)



(https://groups.io/g/HP-Agilent-Keysight-equipment/attachment/127414/2/pic2.jpg)

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Sven Schnelle

Jun 24 (https://groups.io/g/HP-Agilent-Keysight-equipment/message/127415)

Hmm, just noted that i'm measuring 0V across the FM coil in the YIG. Guess that's not normal...

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hardyhansendk

Jun 24 (https://groups.io/g/HP-Agilent-Keysight-equipment/message/127416)

Sven
Contact me offlist
Hardy

Fra: HP-Agilent-Keysight-equipment@groups.io [mailto:HP-Agilent-Keysight-equipment@groups.io] På vegne af Sven Schnelle via groups.io

Sendt: 24. juni 2022 20:32

Til: HP-Agilent-Keysight-equipment@groups.io

Emne: Re: [HP-Agilent-Keysight-equipment] E4407B LO unlock

Hi Hardy,

7/28/22, 1:07 PM

HP-Agilent-Keysight-equipment@groups.io | E4407B LO unlock

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On Fri, Jun 24, 2022 at 7:21 PM hardyhansendk via groups.io (<http://groups.io>) <[hardyhansen@mail.tele.dk@groups.io](mailto:hardyhansen@mail.tele.dk)> (<mailto:mail.tele.dk@groups.io>)> wrote:

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Hardy

-----Oprindeligt meddelelse-----

Fra: HP-Agilent-Keysight-equipment@groups.io (mailto:HP-Agilent-Keysight-equipment@groups.io)

[mailto:HP-Agilent-Keysight-equipment@groups.io (mailto:HP-Agilent-Keysight-equipment@groups.io)] På vegne af Sven Schnelle

Sendt: 24. juni 2022 18:38

Til: HP-Agilent-Keysight-equipment@groups.io (mailto:HP-Agilent-Keysight-equipment@groups.io)

Emne: [HP-Agilent-Keysight-equipment] E4407B LO unlock

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([http://www.avg.com/email-signature?](http://www.avg.com/email-signature?utm_medium=email&utm_source=link&utm_campaign=sig-email&utm_content=emailclient)

[utm_medium=email&utm_source=link&utm_campaign=sig-email&utm_content=emailclient](http://www.avg.com/email-signature?utm_medium=email&utm_source=link&utm_campaign=sig-email&utm_content=emailclient))

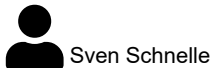
Virusfri. www.avg.com ([http://www.avg.com/email-signature?](http://www.avg.com/email-signature?utm_medium=email&utm_source=link&utm_campaign=sig-email&utm_content=emailclient)

[utm_medium=email&utm_source=link&utm_campaign=sig-email&utm_content=emailclient](http://www.avg.com/email-signature?utm_medium=email&utm_source=link&utm_campaign=sig-email&utm_content=emailclient))

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Jun 24 [🔗 \(https://groups.io/g/HP-Agilent-Keysight-equipment/message/127419\)](https://groups.io/g/HP-Agilent-Keysight-equipment/message/127419)

I put the SA now to 0Hz CF, zero SPAN. I'm measuring 3.009GHz LO frequency, where i would expect 3.921GHz. However, the 'LO TO HIGH' Phase detector is lit. Increasing the CF in 100Mhz steps shows that the LO locks again at 2.2Ghz, even with 100Mhz span. Decreasing the Center frequency, the LO unlocks at 1.3GHz. The input to the Phase detector is 4.7875Mhz when locked, but when unlocked it's about 7Mhz and the LO TO HIGH indicator is on.

The output of the 1GC1-4120 frequency divider also changes at the 1.3GHz / 2.2GHz threshold: above 2.2GHZ it seems to divide by 8, and below 2.2Ghz it seems to divide by 4.

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Jun 24 [🔗 \(https://groups.io/g/HP-Agilent-Keysight-equipment/message/127420\)](https://groups.io/g/HP-Agilent-Keysight-equipment/message/127420)

you can order the 4407B CLIP download for \$12.50 from here.
<https://artekmanuals.com/manuals/hp-manuals/> (<https://artekmanuals.com/manuals/hp-manuals/>)

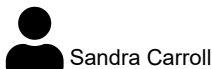
Mind you its not 100% perfect, i found some pages missing for example
I wish it had the BITG schematics myself for the 3ghz TG

Sandra

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Jun 24 [🔗 \(https://groups.io/g/HP-Agilent-Keysight-equipment/message/127422\)](https://groups.io/g/HP-Agilent-Keysight-equipment/message/127422)

25.00 not 12.50

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Mark Bielman (</g/HP-Agilent-Keysight-equipment/profile/502679>)

Jun 24 [🔗 \(https://groups.io/g/HP-Agilent-Keysight-equipment/message/127423\)](https://groups.io/g/HP-Agilent-Keysight-equipment/message/127423)

The CLIP I purchased was for the older version of the RF front end.
I looked at a newer board a while ago and it's different! So the CLIP was useless in that case.

So beware.

Mark

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Sandra Carroll

Jun 24  (<https://groups.io/g/HP-Agilent-Keysight-equipment/message/127425>)

Yes, there is only 1 known CLIP out there and it is for specific board/revisions.
I don't believe the overall architecture changed but specific board changes which would mean
You can use the schematic for reference still even if it is not a perfect match.

The point to me is one is a guide, and you can use the block diagram and schematic and compare
oo you board, you are going to see the same block. Some components may be different sure but what's
Going into that block and coming out of would still be the same.

This is IMHO of course.

I do wish some of those with clips would share them still


Sandra

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Mark Bielman (</g/HP-Agilent-Keysight-equipment/profile/502679>)Jun 24  (<https://groups.io/g/HP-Agilent-Keysight-equipment/message/127426>)

Hi Sandra,

Yes I agree that the CLIP is worth it even if used as a reference and /or a tutorial.
In the specific case of the LO Unlock error (as seen in the Signal Path video)
I was able to repair 2 units that had the error - same problem described in the video. (go figure)

Recently at work, one of our E4407B's had the error. Was asked to look at it.
So, pulled the RF Deck and the board was very different. Made it difficult to troubleshoot.
I gave up since this was a day job unit and not mine.
(the company paid \$\$\$\$ to repair it - I'm sure just replaced the RF Deck Assy)

FWIW

Mark

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Sven Schnelle

Jun 25  (<https://groups.io/g/HP-Agilent-Keysight-equipment/message/127432>)

Yeah, the Video vom TSP was one of the reasons why i bought that E4407B - i thought it's an easy repair :-)
But i was surprised to see the quite different RF deck assembly. I guess it was even repaired by Keysight before,
because the machine has a MY41 serial, but the board has 2016 date codes on it. Even this 1GC1-4210 frequency
divider has Keysight instead of Agilent written on it.

I'm not sure whether i wait until an RF board passes by, or whether i sell that unit as defective. I still have
an old HP 8563E which is a nice machine. Main reason why i wanted the 4470B is the faster sweep time.

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James Holtzman

Jun 25  (<https://groups.io/g/HP-Agilent-Keysight-equipment/message/127439>)

Looks like we did a good job of hijacking this thread, but I noticed quite a few methods of working with SMD components.

I'd recommend that you search for "luis rossmann." He runs a business in repairing apple products and does a lot of SMD work. He has a number of youtube videos out there, he knows what he is doing and does a good job, just too bad that apple will not sell components, at least that's what I understand.

I use a small tool that can operate as a solder sucker or heat gun. Along with using a quality rosin solder flux, I've had very few problems removing SMD components. I use a solder alloy, 63/37, a eutectic alloy, sorry, I still use lead. Sometimes I will use a silver alloy too, depending on the job. Although I have solder cream, I seldom use it.

I'm sure there a lots of youtube videos on the subject, but just watch Luis.

Jim

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Harvey White

Jun 25  (<https://groups.io/g/HP-Agilent-Keysight-equipment/message/127440>)

When desoldering an SMD part, you have a bunch of choices. If it's a simple resistor or capacitor, then a tweezer desoldering iron is good, or one with a specific "fork" size that allows hitting both pads at the same size (Metcal does this).

For an SO style package (two lines of pads), there used to be an IC desoldering tool for ungar, that was a solid bar that was brought to temperature. You put that bar on one side of the chip, melt the solder, and then pry up gently to free those pins.

Some desoldering tools (Metcal again, and perhaps others), use a U shaped tip, length = chip length and width to touch the pins. Put that on the chip leads, melt the solder on both sides, and twist slightly to pull the chip away from the pads. Doing this upside down can help, perhaps a small soldering tool to free the chip, but do not use excess force because that can lift an unmelted pad.

Generally, in my experience, desolder wick will get most of the solder, but still not remove enough to break the pin completely free from the pad. It might require touching the pad with a tip, and at the same time very gently prying the pin up just far enough to break the contact. Experience here can be important.

The classic way (for both 2 and 4 sided chips), is hot air, which is moved fast enough to keep the solder on all pins molten, and the chip can be lifted off with a vacuum tool. This can be tricky.

Harvey

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Adrian Godwin

Jun 26  (<https://groups.io/g/HP-Agilent-Keysight-equipment/message/127444>)


I find hot air destroys too much around the targeted part. I favour a variant of the tweezers which have wide blades, picking the whole SO part in one go.

I bought one of the MHP30 hotplates recently. At first I was disappointed - it seemed far too small to be useful. But in fact, it works pretty well for both rework (heating too much area, but using cold tweezers to gently remove the part) and for construction as long as the board is small enough to solder it all in 2-3 sections. I'm less confident about larger boards but have had good success on some twice the width of the hotplate.

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Dave McGuire (/g/HP-Agilent-Keysight-equipment/profile/77825)

Jun 26  (<https://groups.io/g/HP-Agilent-Keysight-equipment/message/127448>)

On 6/26/22 10:15, Adrian Godwin wrote:

I find hot air destroys too much around the targeted part.

If this is happening, "you're doing it wrong." ;)

You're either using a nozzle that's too large, the air volume is turned up too high, or the temperature is too low.

Hot air is used almost exclusively in industry for SMT rework, for all except BGA packages. (IR is usually used for those) It works well and, when used properly, does not damage components or boards.

-Dave

--

Dave McGuire, AK4HZ
New Kensington, PA

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Chuck Harris

Jun 26  (<https://groups.io/g/HP-Agilent-Keysight-equipment/message/127449>)

The biggest failure with hot air that most people have is due to ignorance. It is absolutely essential that you always use underboard heating whenever you rework a board using hot air.

Adding 100C to the bottom of the board will make the work on the top side quick and do-able with minimum heat.

The second failure is due to turning up the air too high. You can easily blow other parts away if your air is set to the small gale range.

The third failure is in not shielding things that were added manually to the board. Many connectors use plastic that cannot handle reflow temperatures. Simply put a piece of shiny aluminum foil "duct" tape on things you don't want to get hot.

-Chuck Harris

On Sun, 26 Jun 2022 10:47:13 -0400 "Dave McGuire" <mcguire@neurotica.com> wrote:

On 6/26/22 10:15, Adrian Godwin wrote:

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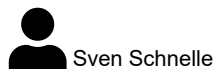
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-Dave

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Sven Schnelle

Jun 26 (<https://groups.io/g/HP-Agilent-Keysight-equipment/message/127450>)

Hi List,

I spent some time again with the SA, and I'm not sure whether I was right that the prescaler works. I found this very helpful post: <https://groups.io/g/HP-Agilent-Keysight-equipment/message/115929> (<https://groups.io/g/HP-Agilent-Keysight-equipment/message/115929>), which has the pins of the prescaler. In my SA the A1/A2/A3 pins which set the divide ratio are always at +4.7V - so the prescaler is set to /16. I never see the A1 pin changing, so it seems to always use /16 mode. However, measuring the input and output frequencies, I get:

CF 3 GHz = LO 5.865GHz -23.5dBm = 366.7MHz = /16

CF 2 GHz = LO 4.909GHz -25.5dbm = 613.7MHz = /8

CF 1 GHz = LO 3.952GHz -23.5dBm = 494.3Mhz = /8

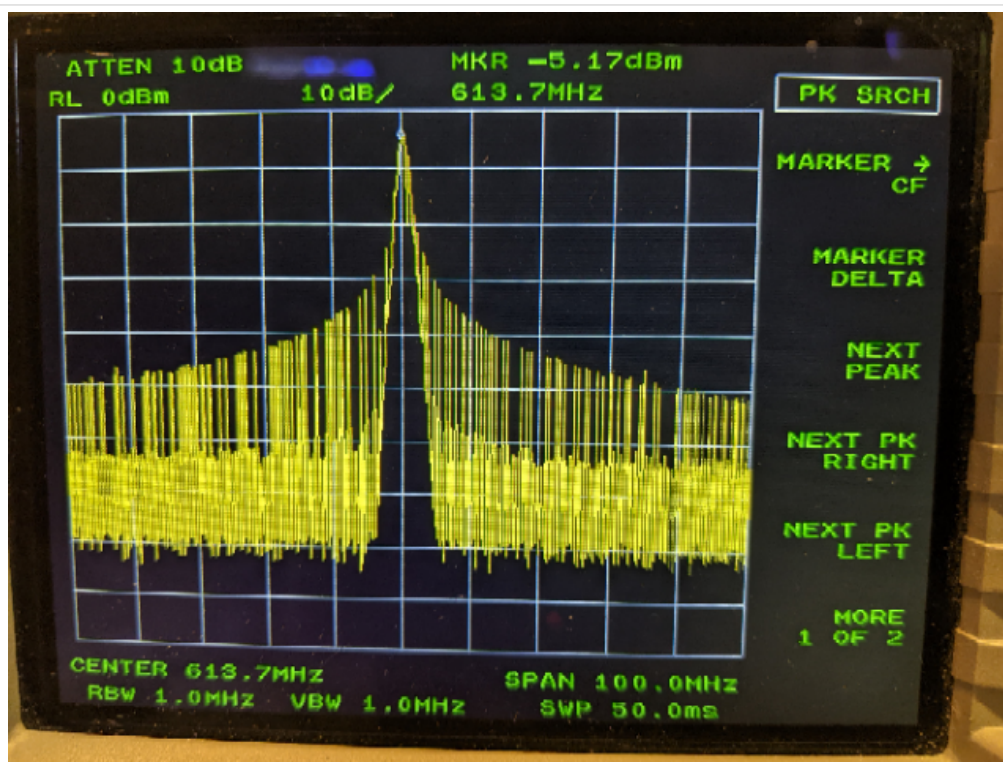
CF 0 GHz = LO 2.997GHz -25.5cBm = 374.8MHz = /8

Which suggests that the prescaler switches between /8 and /16 mode, even if the selector pins don't change?! Doing a slow sweep, I see a lot of distortion around 2.3GHz, and the prescaler output does a jump from ~600MHz back to 250MHz.

So this all looks very suspicious, and I assume that the prescaler is broken. Does anyone know when the SA will switch the divider from /16 to /8 mode? I haven't seen that line except during poweron.

Regards

Sven

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(<https://groups.io/g/HP-Agilent-Keysight-equipment/attachment/127450/0/spectrum.jpg>)

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Sven Schnelle

Jun 26 [🔗 \(https://groups.io/g/HP-Agilent-Keysight-equipment/message/127451\)](https://groups.io/g/HP-Agilent-Keysight-equipment/message/127451)

I uploaded the video of prescaler out during a slow sleep from 0-3GHz: <https://photos.app.goo.gl/z3p6H4YSX7uEYWK99>
(<https://photos.app.goo.gl/z3p6H4YSX7uEYWK99>)

Sven Schnelle via groups.io (<http://groups.io>) <svenschnelle79@googlemail.com@groups.io (<mailto:googlemail.com@groups.io>)> schrieb am So., 26. Juni 2022, 17:40:

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pianovt

Jun 26 [🔗 \(https://groups.io/g/HP-Agilent-Keysight-equipment/message/127457\)](https://groups.io/g/HP-Agilent-Keysight-equipment/message/127457)

Sven,

I can't answer your question about the divide numbers, but I think some of these dividers needed a minimum input signal level, or they would oscillate. (This was in their specification sheets). So, make sure you have a strong enough signal going into the divider.

Vladan

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20 of 30 > (https://groups.io/g/HP-Agilent-Keysight-equipment/topic/e4407b_lo_unlock/91968578?p=Created%2C%2C%2C20%2C1%2C20%2C0&next=1)

← (<https://groups.io/g/HP-Agilent-Keysight-equipment/topic/92587616?p=%2C%2C%2C20%2C0%2C0%2C0%3A%3A%2C%2C%2C0%2C0%2C92587616>)

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