

Tap the ICOM IC 821H IF with the PAT12M5 to provide a real time panadaptor

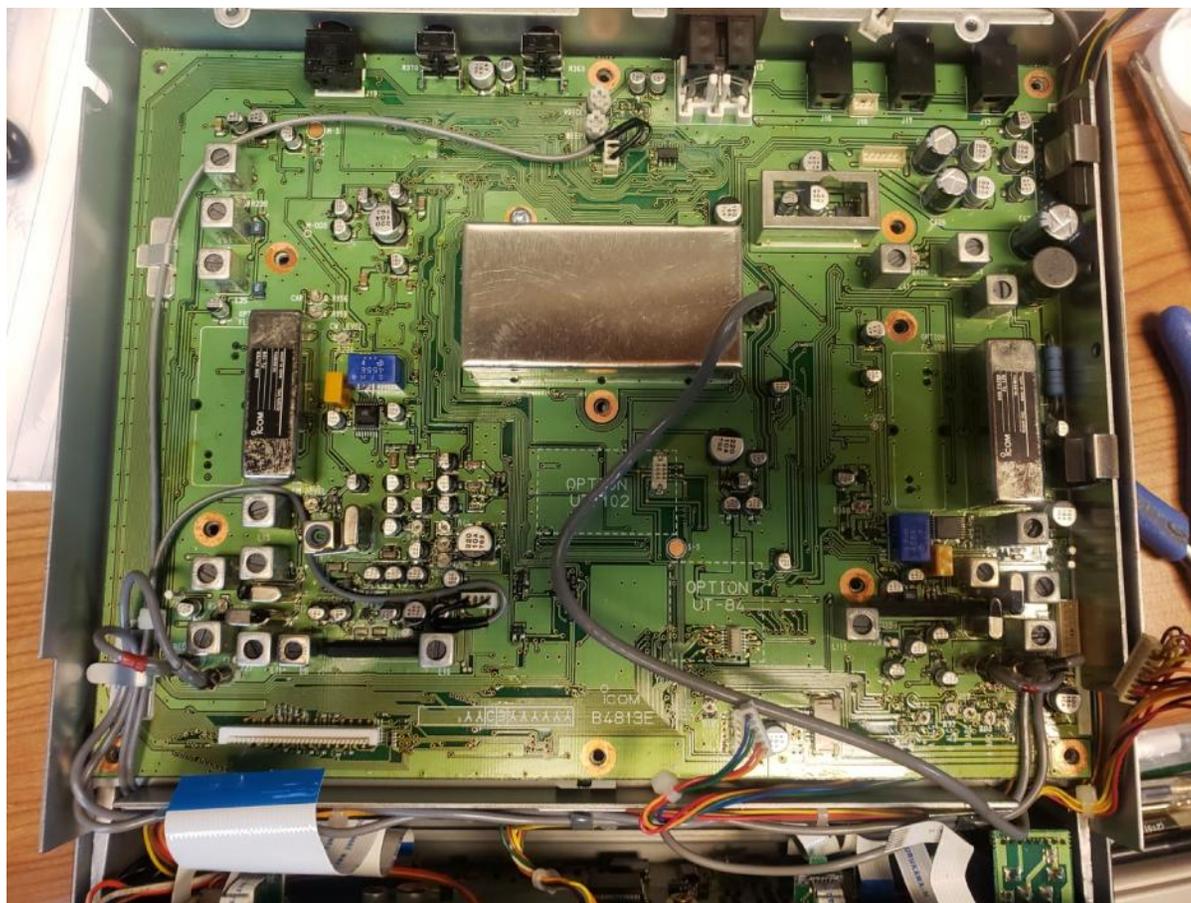


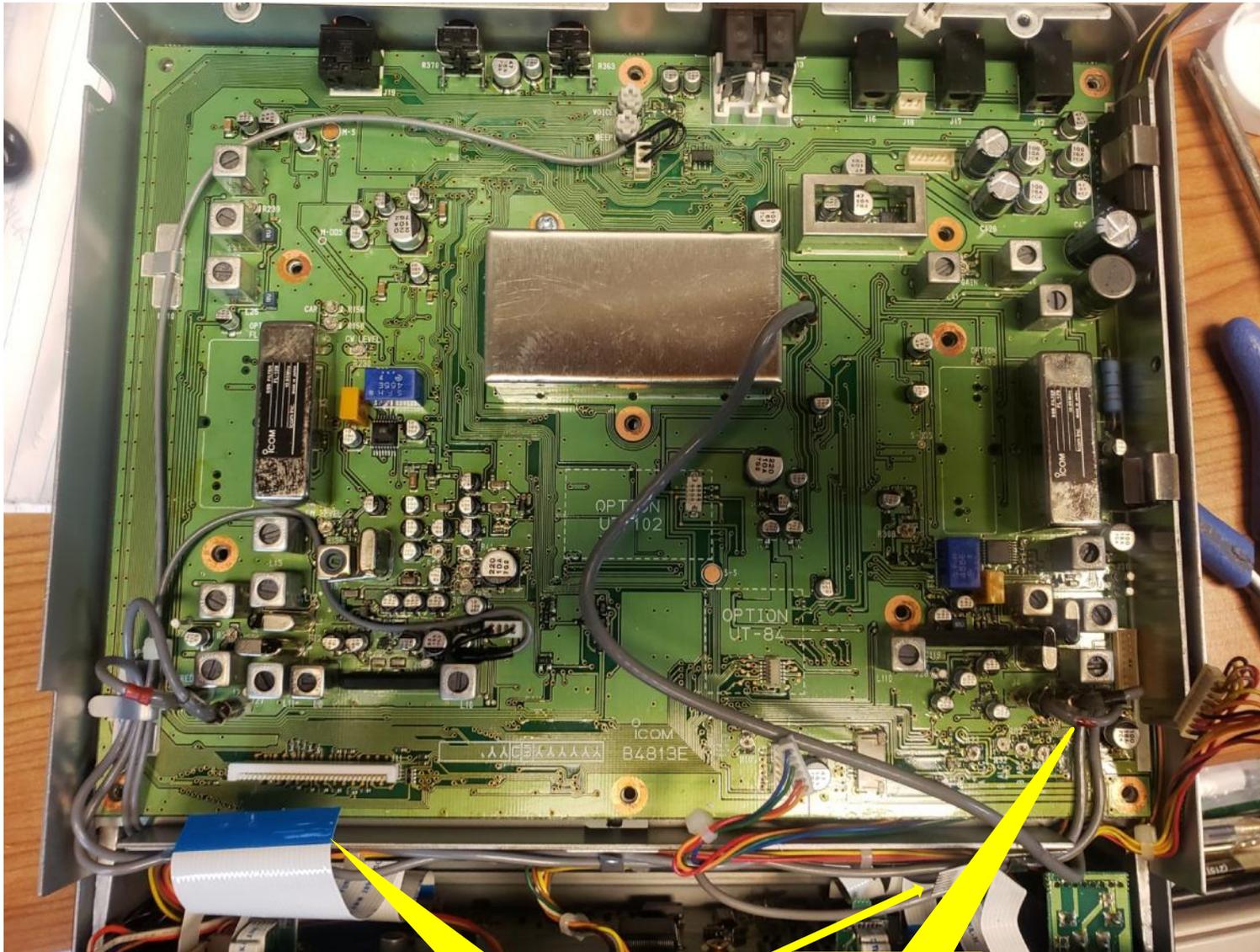
By n3gdq/n3gdq@yahoo.com

I purchased the PAT12M5 from David Calo for installation
First Disassemble the Radio and get to the main board per the Service
Manual

- The service manual can be downloaded from ICOM's manual downloads website per the link/address below
- http://www.icom.co.jp/world/support/download/manual/disp_down.php?ID=20010101122&GNR=Amateur&TYPE=Base%20Station&PDNM=IC-821H&INQWORDSWT=No

Locate the main board per section 3 of the service manual. It will be located on the underside of the rig. This board will have to be removed as this is where the PAT12M5 will be connected. It is important to note the positions of all connectors.





Take precautions and be gentle with the ribbon cables

I marked this red to help with re-assembly

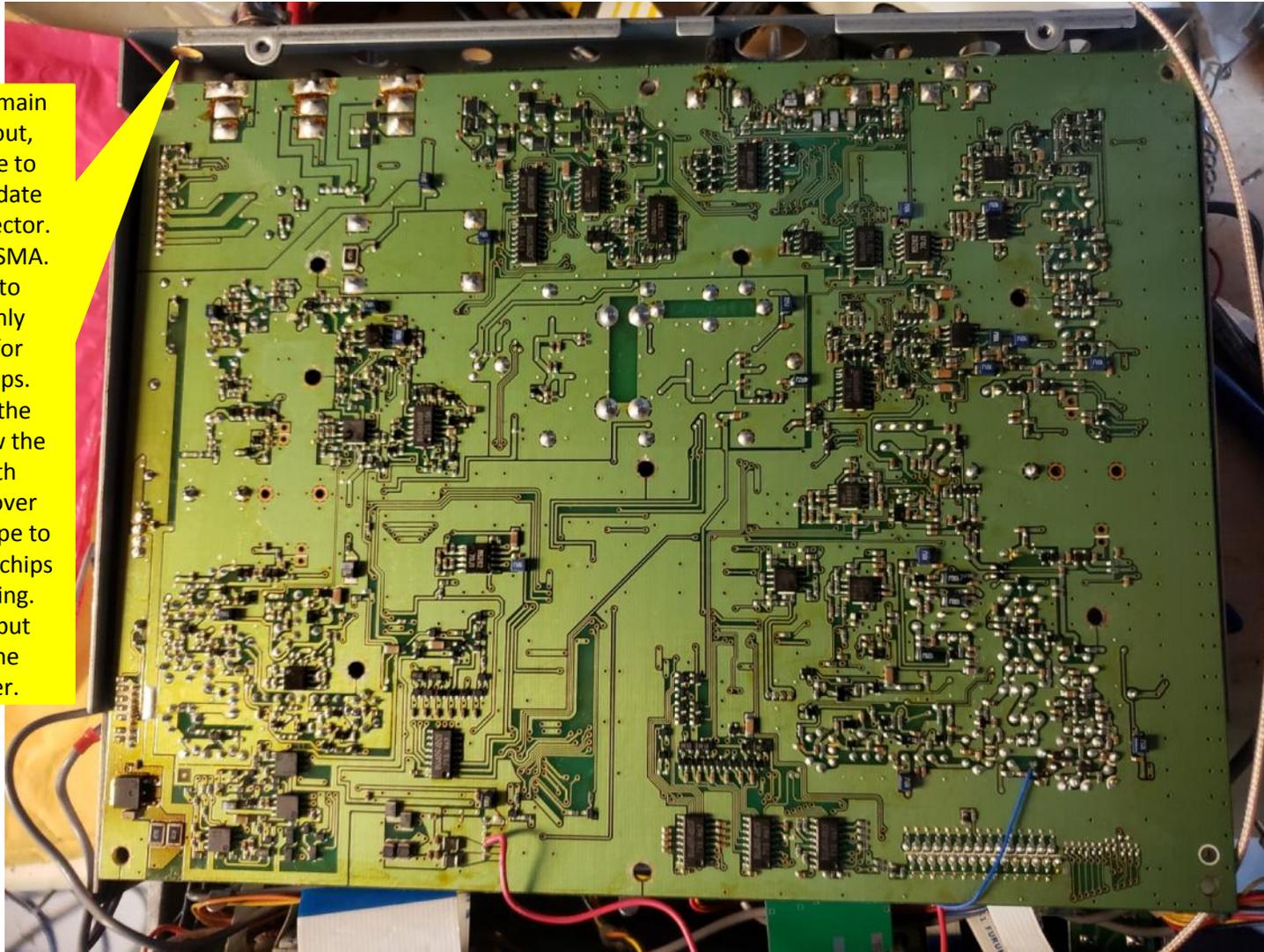
I used a ground strap connected to my external station ground

First I removed all connectors including the coax and both ribbons. Take care with the multi-wire cable and handle by the connector.

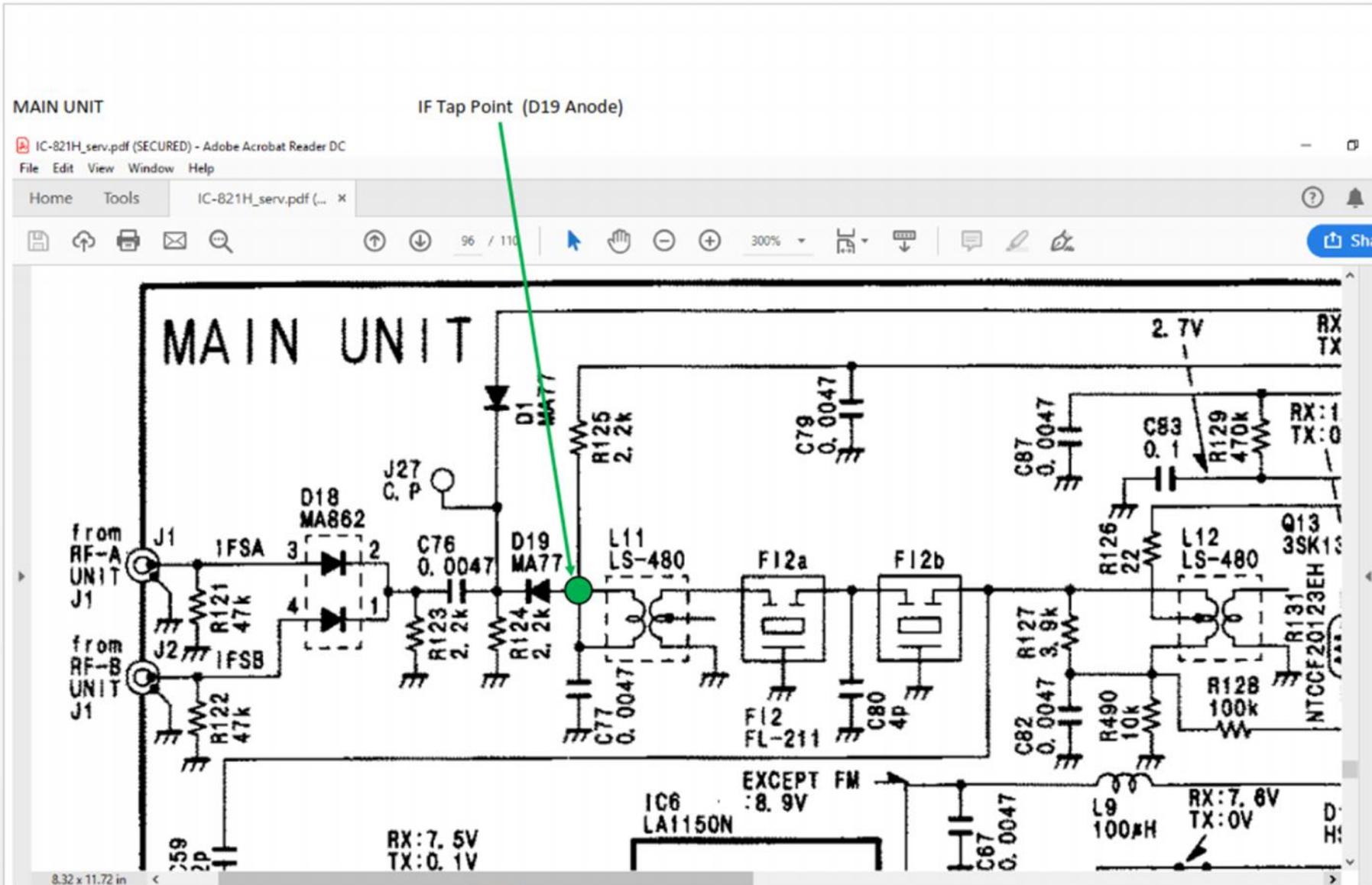
Next, I removed all screws. All copper pads shown have screws. Don't forget the one at the upper right corner with no pad. Use a number 1 phillips and be patient to avoid slipping and damaging traces

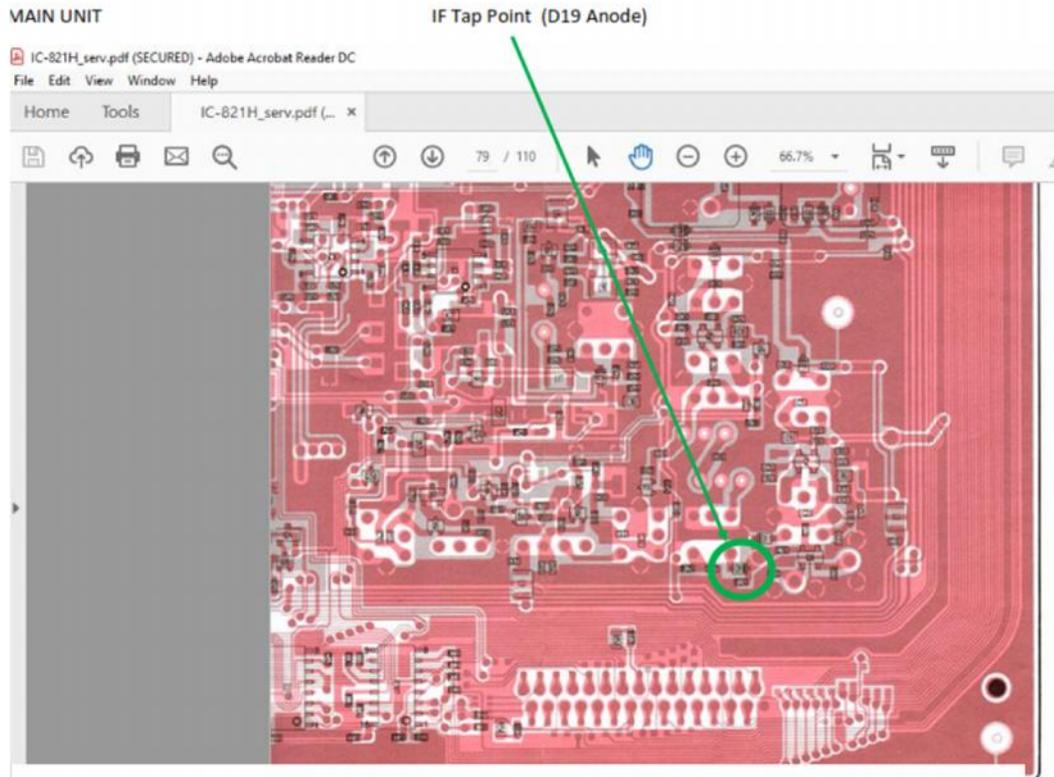
The underside of the main board assembly is shown below. Note the blue and red wires connected. This is where the board will need to be tapped for the PAT12M5. I used 60/40 solder with a 750 degree pencil tip iron. I also used a tool makers microscope during soldering. I recommend 10-20 X magnification as it will help to prevent accidental solder bridges. I made these connections first and soldered to the PAT12M5 later. It just worked out based on my plans for mounting the board when all connections were completed.

While the main board is out, drill a hole to accommodate your connector. I used the SMA. Be sure to thoroughly inspect for metal chips. Covered the area below the hole with doubled over masking tape to collect any chips from drilling. Obvious but worth the reminder.

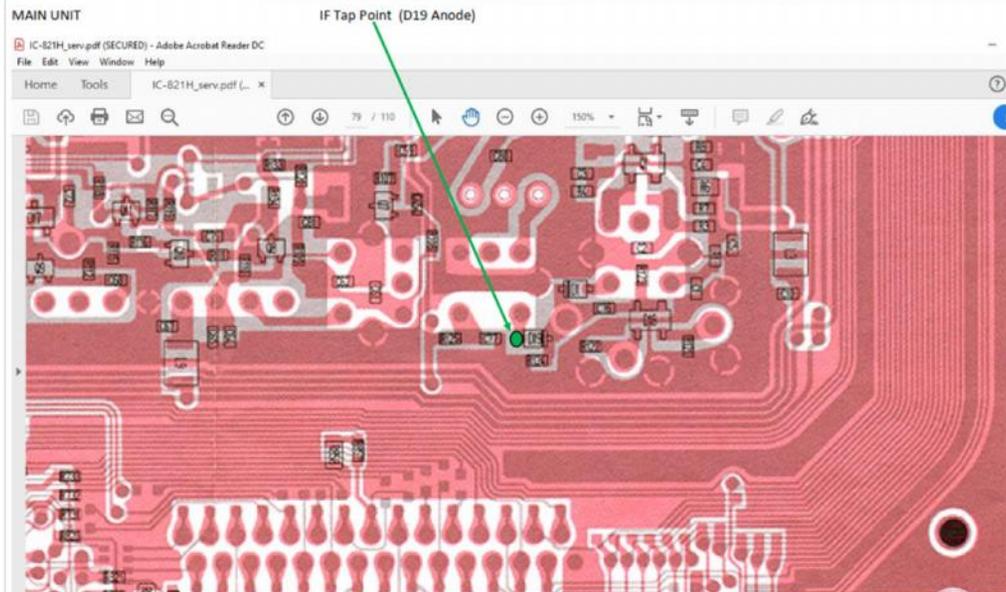


The point on the schematic for the signal tap. This is the correct point. Any point further down the IF chain will signal visibility to the width of the filters. This point will work for both 144 and 432 mhz as they both share a common IF.

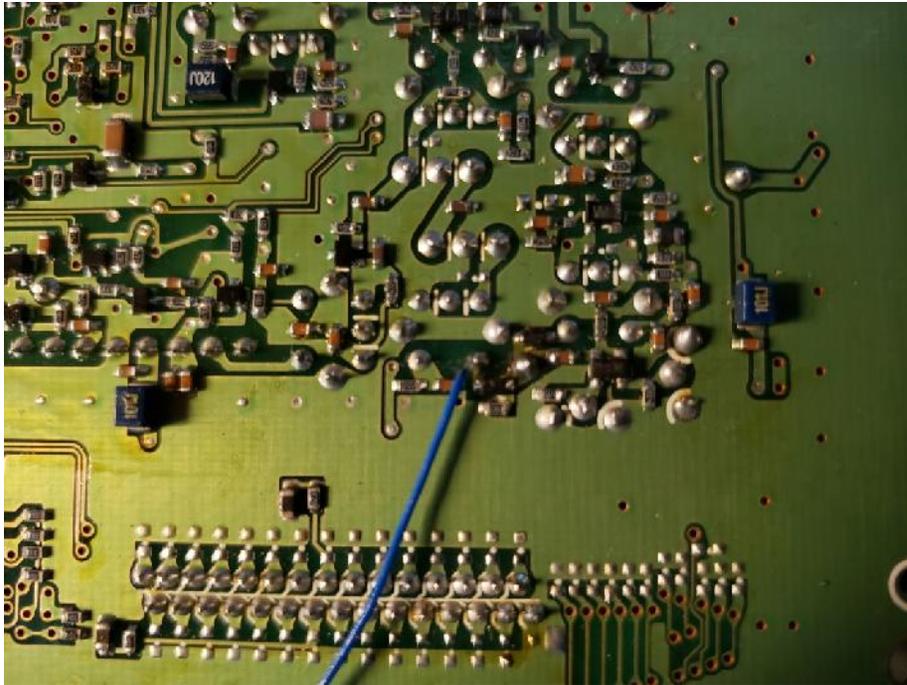




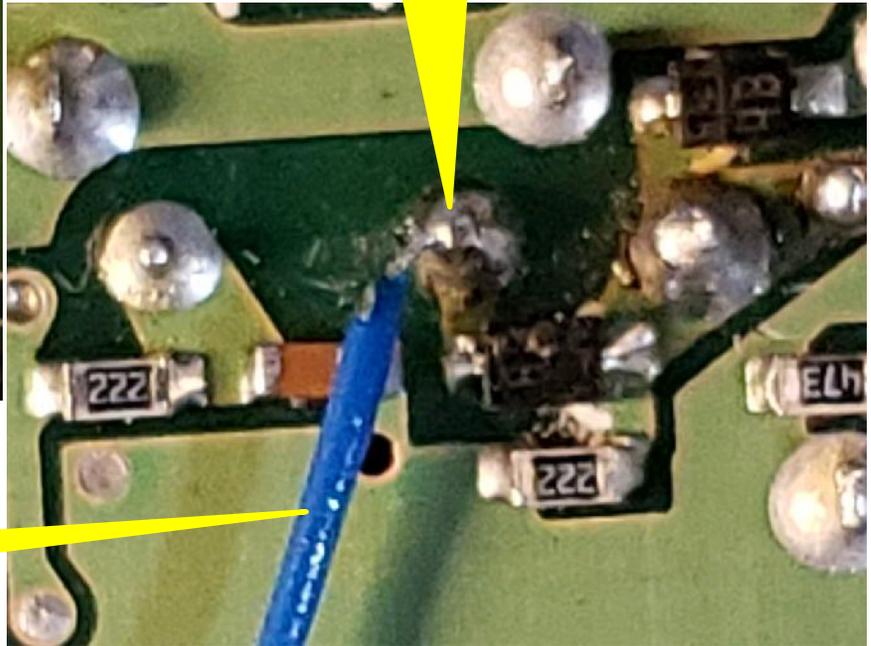
What the IF
signal tap
looks like on
the PCB
artwork



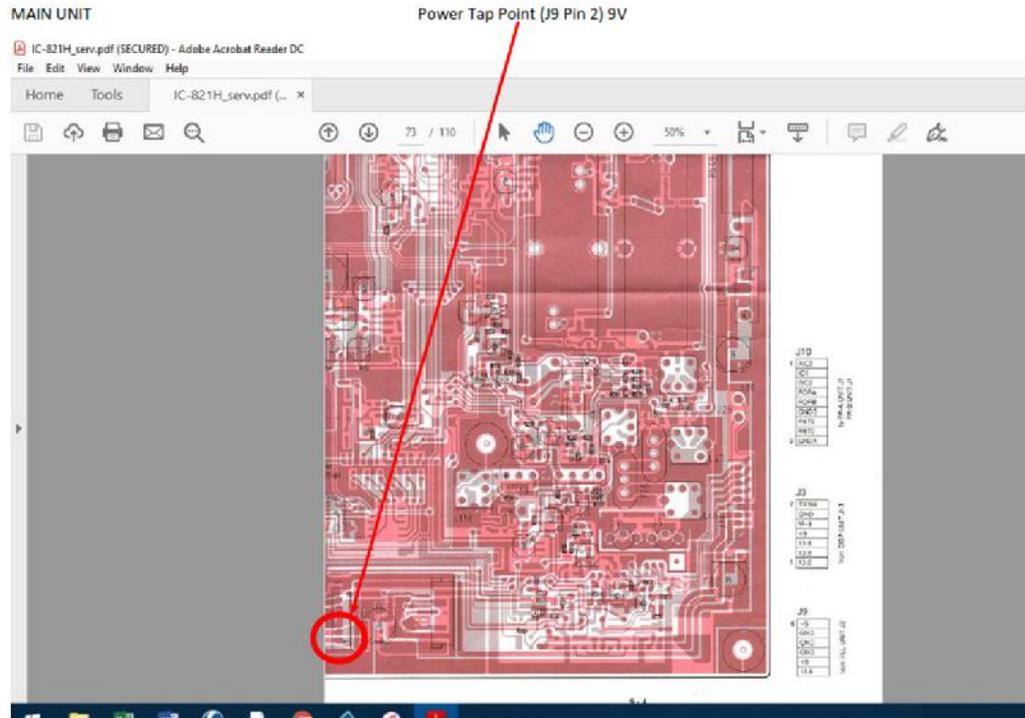
What the IF signal tap looks like when completed. Per the instructions I kept the blue tap wire to about 2.5" which is a short as I could make it per my chosen mounting position for the PAT12M5. This wire is 30 awg and is very fragile at both solder points. Take your time, pre-tin the wire but do not wick solder up under the insulation as it will embrittle the joint which limits flexibility.



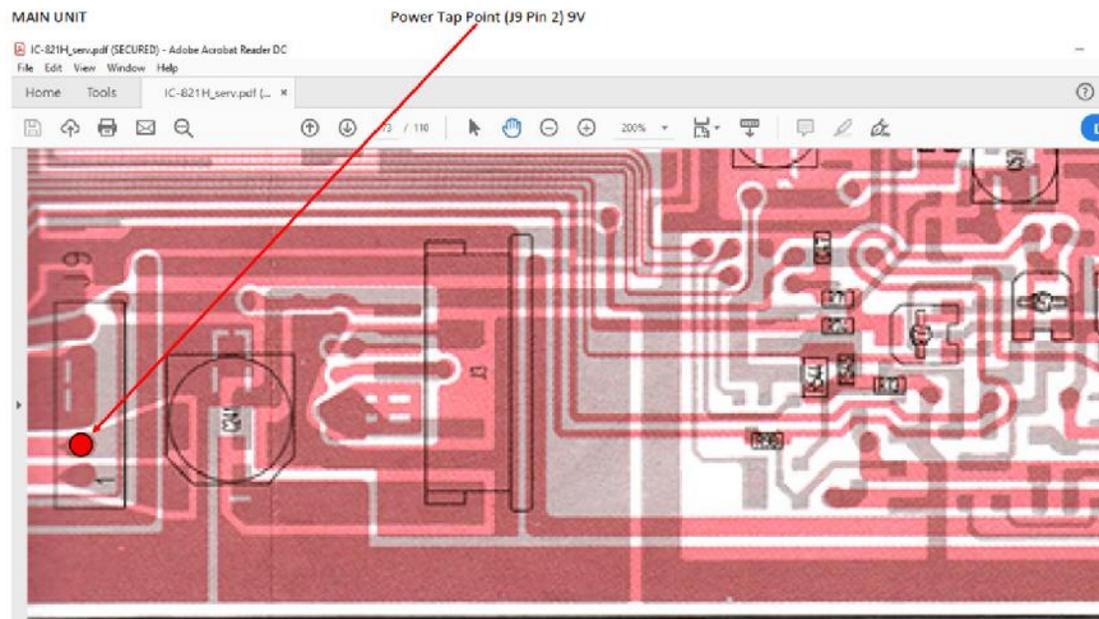
I didn't solder to the D19 directly. I soldered to the post to avoid issues with D19



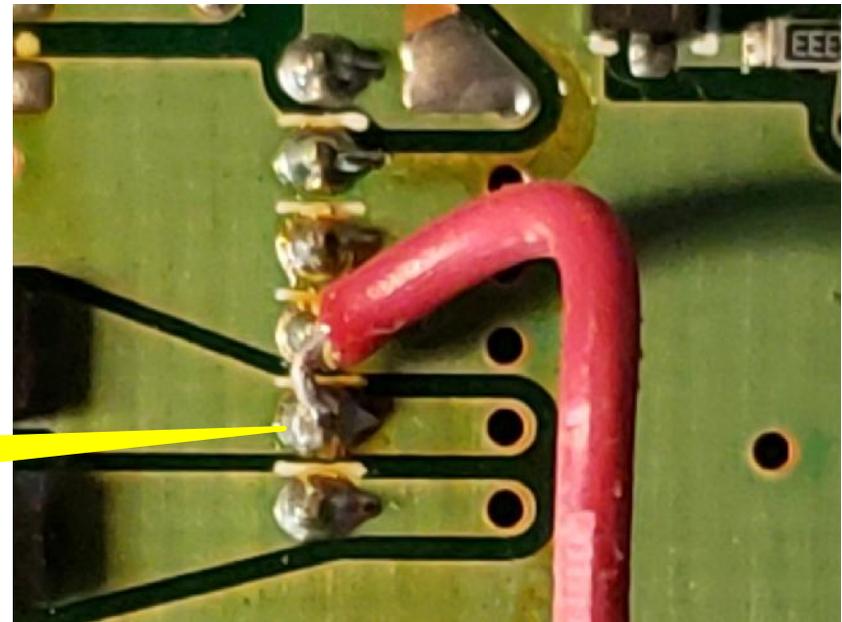
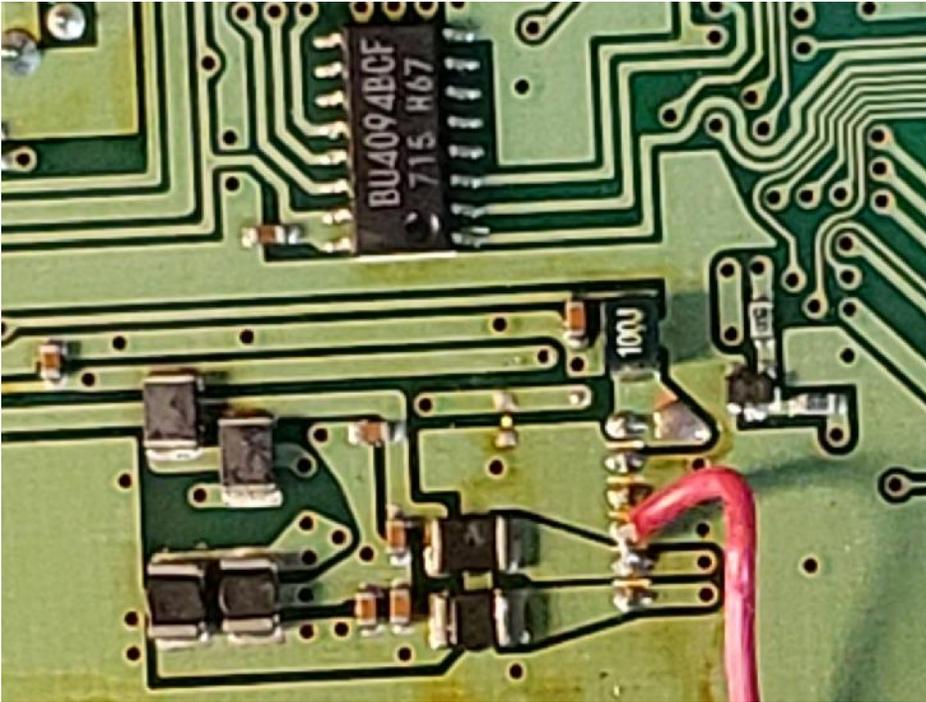
The blue wire is the 30 AWG included in the kit and recommended for this purpose



What the
power tap
looks like
on the
PCB
artwork

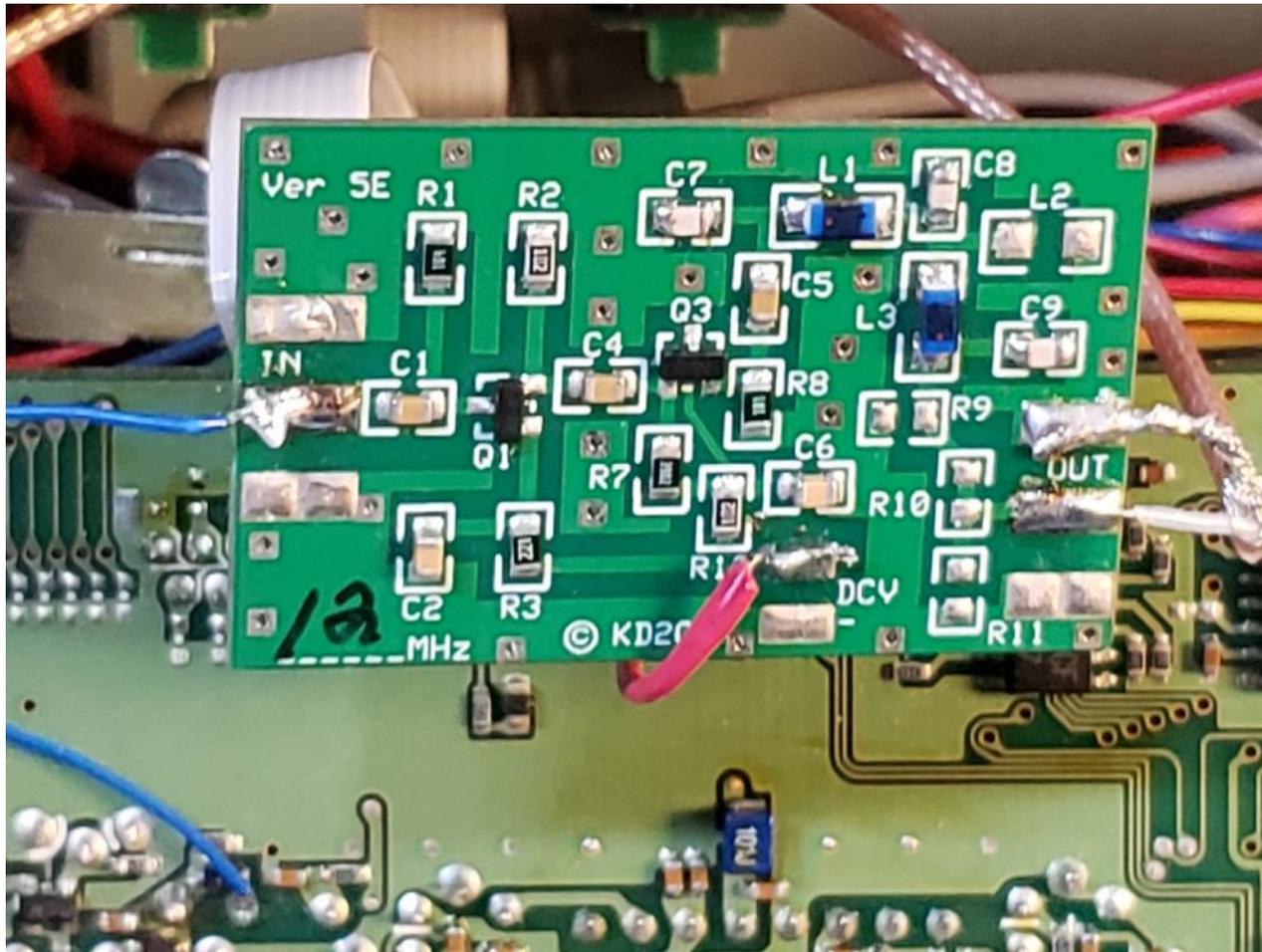


What the power tap looks like when completed

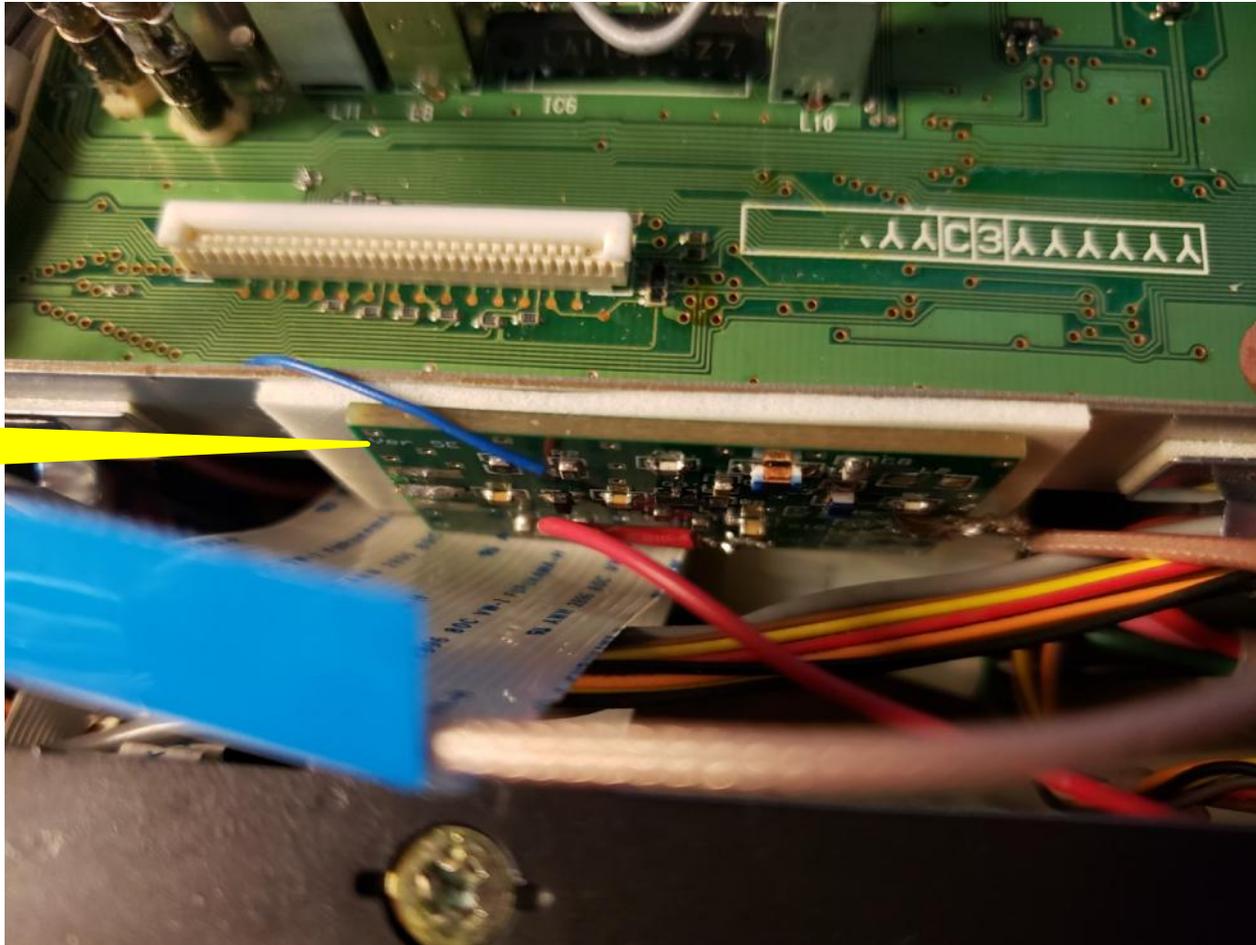


The connection at pin 2. Confirm with voltmeter if you are not sure. You will see 9 VDC during rec. and 0 VDC during xmit.

The PAT12M5 after soldering all connections per instructions. I soldered the connections to the PAT12M5 in this position. I used a piece of thin, flexible cardboard underneath the board to protect the main board. I chose to do this to avoid having to manipulate/support the board while soldering to the main board.



My choice for mounting the PAT12M5 with the double sided tape provided. The extra ½" length of the blue wire (2" max recommended) was necessary to achieve this. I did not see an alternative under the main board. It is difficult to remove the PAT12M5 from the tape once applied, so take your time and plan your final placement.



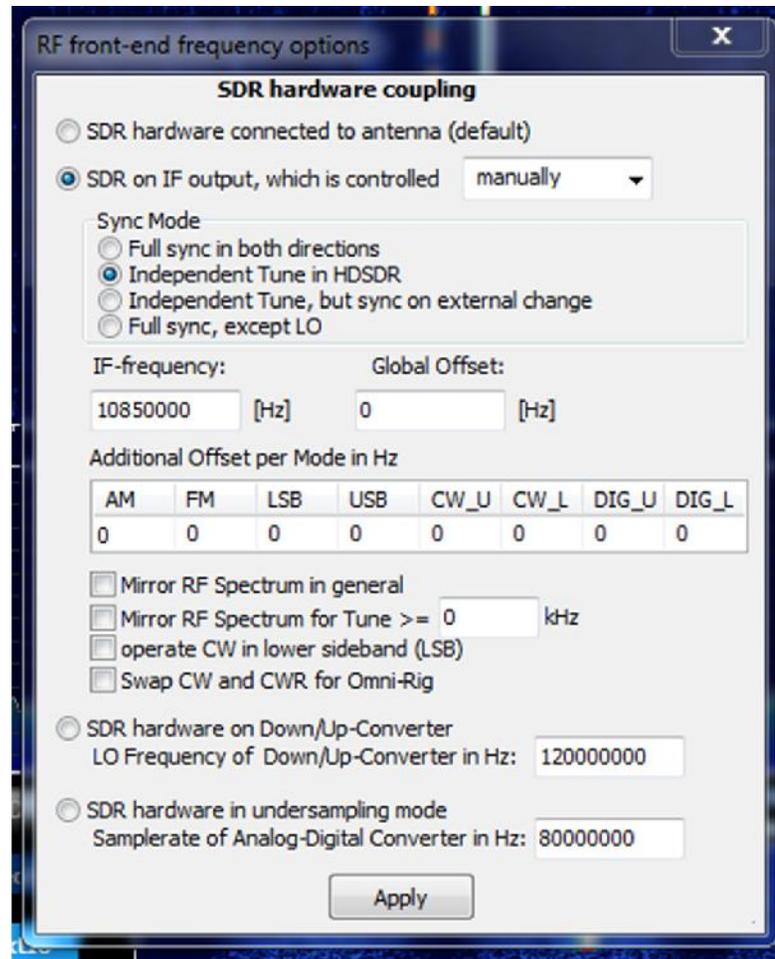
The final position in my radio

Mount the output connector and re-route all cables/wires as close to how you found them as possible (nothing's perfect). Double check to be sure all cables and connectors have been replaced and are seated correctly. Be patient, careful and gentle to avoid bending/breaking pins. Then put the covers back on, reconnect antenna's, power and your SDR and fire it up!

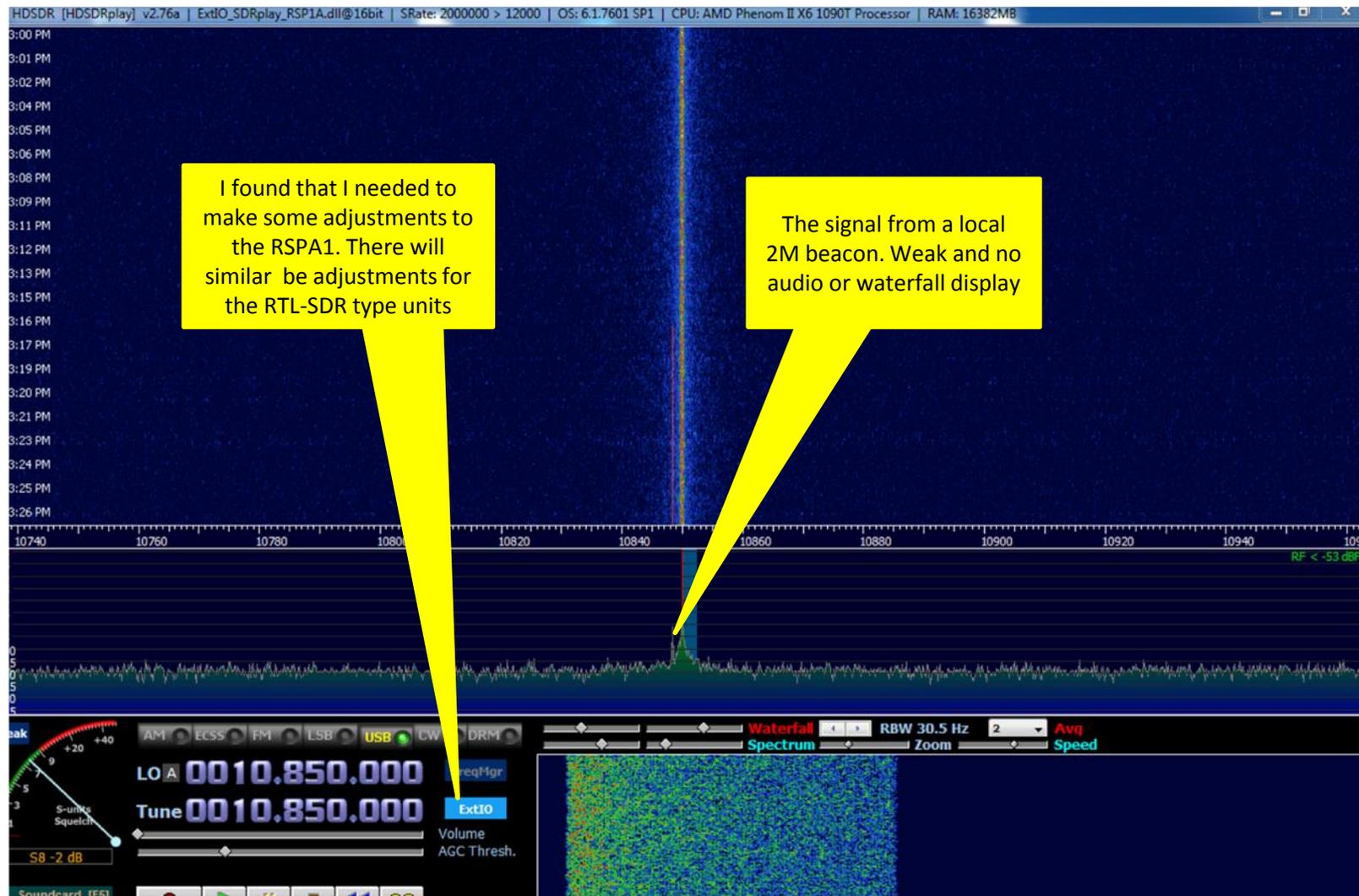
My SMA connector
and routed coax



HSDR RF Front End Calibration (from the options button).
Right now I am not using computer control of my rig so this is adequate for me.



When I first looked at my screen I was disappointed that I could see little or no signal in the spectrum and nothing in the waterfall when receiving a local 2 meter beacon. David pointed out that the PAT12M5 is a unity gain amplifier which is more or less a buffer. He suggested that I look at the settings in the software for my SDR



The settings that worked for me. For my purposes I don't currently require a bandwidth wider than 200 – 300 kHz. Your needs may vary.

The screenshot displays the SDRplay RSP Device Controller software interface. The main window features a block diagram of the receiver chain and several control panels. The block diagram includes an antenna, an LNA (Low Noise Amplifier), Notch Filters (with checkboxes for MW/FM and DAB), a Reference Frequency Correction (PPM) set to 0.00, a Mixer, an IF Amplifier (with a highlighted section containing a filter and two amplifiers), an ADC (Analog-to-Digital Converter), and a Gain Control section. The IF Amplifier settings are set to Low IF mode and 200 kHz bandwidth. The ADC settings include a Sample Rate of 2.00 MHz, Decimation of 4, Setpoint of 0 dBfs, and a Final SR of 0.50 MHz. The Gain Control section has a slider set to 20. The interface also includes a checkbox for Bias-T Enable, a Total System Gain Reduction of 20 dB, and a checkbox for Enable Tuner AGC which is checked. The bottom status bar shows 'Station: Disabled', 'SDRplay Ltd', 'Version 1.1 Build 0710', and 'Current Profile:'. Navigation buttons for Profiles, Advanced, Load Defaults, Help, and Exit are also present.

SDRplay RSP Device Controller

SDRplay

LNA

Notch Filters

MW/FM

DAB

Reference

Frequency Correction (PPM)

0.00

Mixer

IF Amplifier

IF Mode: Low IF

IF Bandwidth: 200 kHz

ADC

Sample Rate (MHz): 2.00

Decimation: 4

Setpoint (dBfs): 0

Final SR: 0.50 MHz

Gain Control

20

Bias-T Enable

Total System Gain Reduction 20 dB

Enable Tuner AGC

Station: Disabled

SDRplay Ltd

Version 1.1 Build 0710

Current Profile:

Profiles Advanced Load Defaults Help Exit

Additional Offset per Mode in Hz

AM FM LCR USB CW U CW L DTC U DTC L

After corrective adjustments, My Reception of the same local 2 Meter Beacon (Adjust volume/gain as needed)

