Mirage B-5030-G Repair

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A few years ago, as I am on Loop antennas, I bought a used Mirage B-5030-G from a ham's estate to get a little more power out for use during VHF contests. During the June 2025 ARRL VHF contest, my Mirage B-5030-G suddenly developed a high SWR on my ICOM IC-9700. So, it had to be taken offline for the contest. Once the contest was over, I removed the Mirage B-5030-G and put it on the bench to work on it.

I did not have any schematics for it, so I started searching for one on the Internet, but could not find one. I did find one for a Mirage B-3030 on the Repeater Builder's website. The B-3030 had slightly different input ratings, however its output ratings were the same as the B-5030. I suspected it might be similar to my amp, so I downloaded the schematic hoping I might be able to use it. Looking at the B-3030's schematic, it shows it has an input driver section. I opened up the amp and found its circuit board had a pre-driver area bypassed with a piece of coax. I suspect the B-5030 and the B-3030 use the same circuit board and most all the same components, except for the pre-driver section. See Picture # 10 showing the coax bypass of the pre-driver section of the PC Board.

In Picture # 9 which shows the B-3030's schematic for it's input to the driver section. I have marked up it up for the differences between the B-5030-G and the B-3030. Unfortunately for me, my issues appeared to be in the area that was different.

While checking things I managed to smoke an inductor, L1 (bias current injection for the power transistors) in the B-3030 schematic. It blew it's coating off, but was still had a Zero Ohm resistance, so I assumed it was OK, which was a bad choice. Note that L7 is also part of the bias circuit for the base current injection of the power transistors. Looking at the B-3030 schematic, it was pretty obvious L1 was supposed to be a 0.47 uH inductor in the B-5030-G. After removing L1, I measured it with my Heathkit 2240 Inductance meter, which said it was no longer an inductor, as in less than 0.01 uH.

The first item I discovered was the Input Relay had a 5 Ohm contact resistance. As there is no easy way to replace the relay, I started looking at options. As the relays were on stilts and on a second board, I thought maybe I could cut the stilts, then drop sockets on the main board. Maybe sockets like Harwin H8504. Then layout a replacement board using pins, similar to Harwin H2105-01 to plug into the sockets. Then the new board would have new relays on it. That would allow easy replacement in the future.

While I was considering that, it occurred to me it's just dirty relay contacts and there is this product called contact cleaner. So taking an Exacto Knife, I carefully cut off part of the relay's case. See Picture # 1 of what it looked like cut open. I was then able to spray contact cleaner in it and cycled it a few times, and it was back to normal contact resistance. Thinking I had it fixed, I tested it and found the SWR was even worse.

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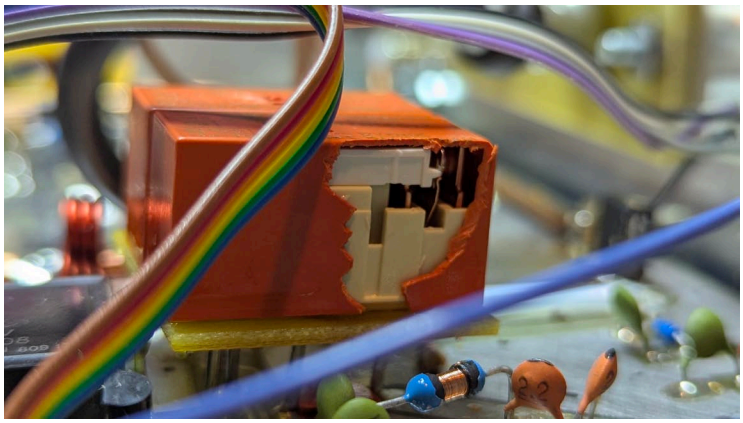
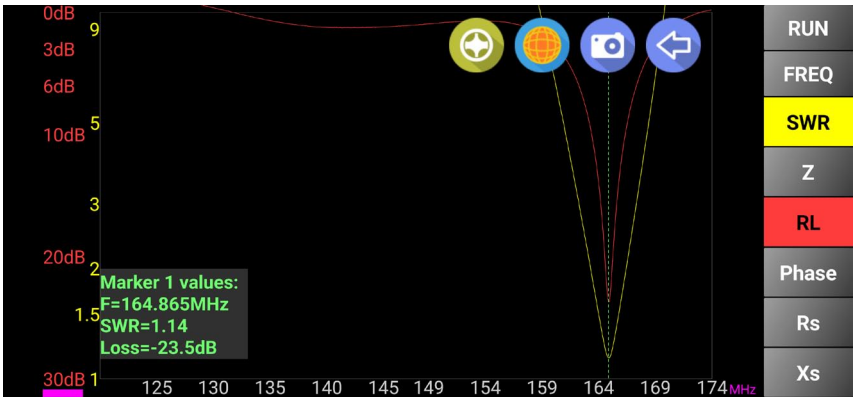
In this picture you can see the cut open relay along with the stilts the board is on. You can also see the inductor I smoked.



Picture # 1

I talked to Tom Holmes, N8ZM and he suggested I use a VNA to check the Amp's input (with it keyed of course). I got out one of my VNAs and checked the input. Doing so showed it had input impedance issues as it was resonant at the wrong frequency. See Picture # 2. I would never have thought of using a VNA, so thanks to Tom for suggesting that. I discovered that one of the input capacitors was bad. It was a Mica Capacitor 750pF 300V 5%.

Also while using the VNA I tapped around looking for loose connections. The SO239 connector seemed to have an issue, so it was replaced as well. After it was replaced tapping had no impact on the VNA.



First scan with VNA Picture # 2

The Amp had a number of same value caps. Some were 300 VDC and some were 500 VDC, I thought I would be smart and buy a couple extras just in case and go with the 500 VDC version. That turned out to be a mistake as well. Once the 500 Volt capacitors arrived, I replaced the Mica Capacitor. The VNA said it was better, but still not great. See Picture # 6. Tom suggested the size of the capacitor was having an impact. So I ordered the smaller 300 VDC capacitors along with 0.47 uH inductors. Replacing the capacitor with the smaller 300 VDC version improved things, see Picture # 7, so Tom was correct, but it still was not what it should have been. In general I always try to only change one

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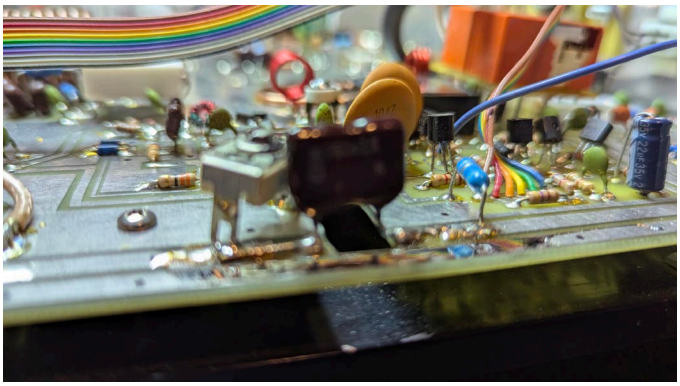
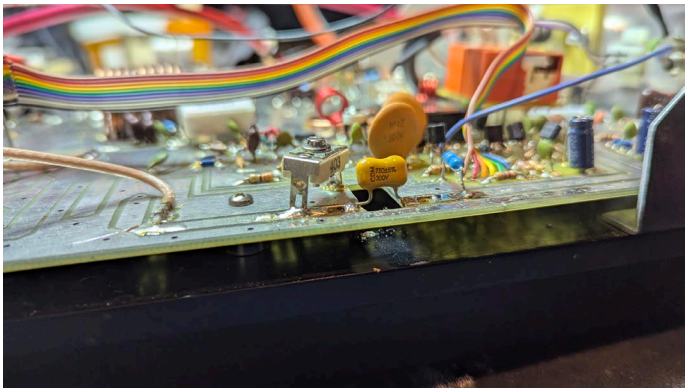
thing at a time. Unfortunately I should have replaced L1 sooner than I did.



Picture # 4



Picture # 5

In picture # 4 above on the left you can see the first 500 VDC capacitor that I used and how it is touching the trimmer capacitor. In picture # 5 above on the right, you can see the 300 VDC capacitor is smaller and does not touch the trimmer capacitor.

I then replaced the inductor and the VNA showed I was on the right track. I then used the VNA to adjust the variable capacitor. Now the VNA says it looks good, see Picture # 8. VNA says it has a 1.2 SWR in the 144.200 MHz range and the ICOM IC-9700 shows about the same amount now that its back in place. In the past it's SWR on the ICOM 9700 was always about 1.8 and as it was rated at 1.8 or less I had figured that was normal. The other interesting thing is I had to reduce the ICOM 9700's power out to maintain the previous power out of the amp. I run the amp at 225 watts instead of it's rated 300 Watts, to stay below the high power class for contest submittals.

Once I had it back in place I realized the TX LED didn't light up on transmit, so the amp was opened up again. I discovered that the current limit resistor was poorly soldered. Minor touch up of the solder on the resistor and the TX LED now works. The Amp is now back in service and working great.

I should mention the VNA I used a MiniVNA along with an Android app called BlueVNA.

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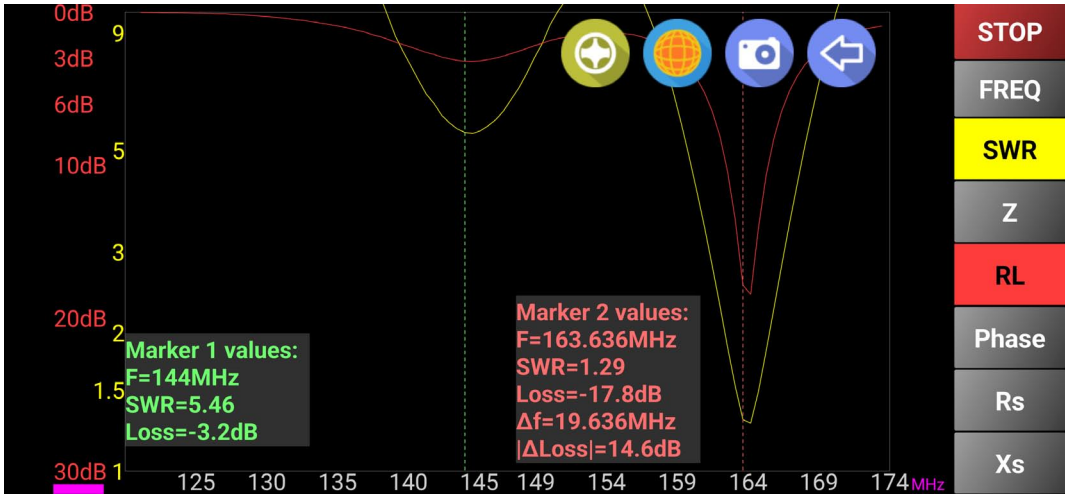
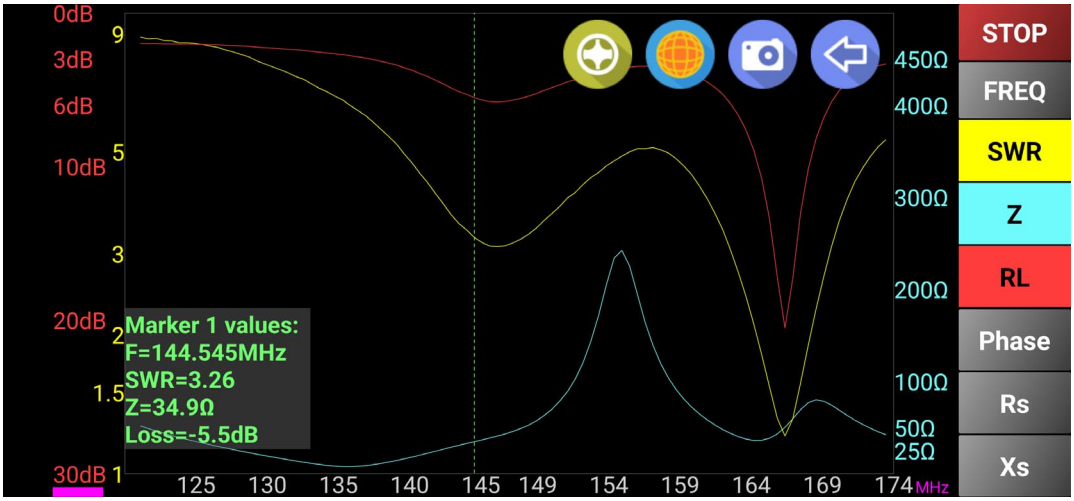


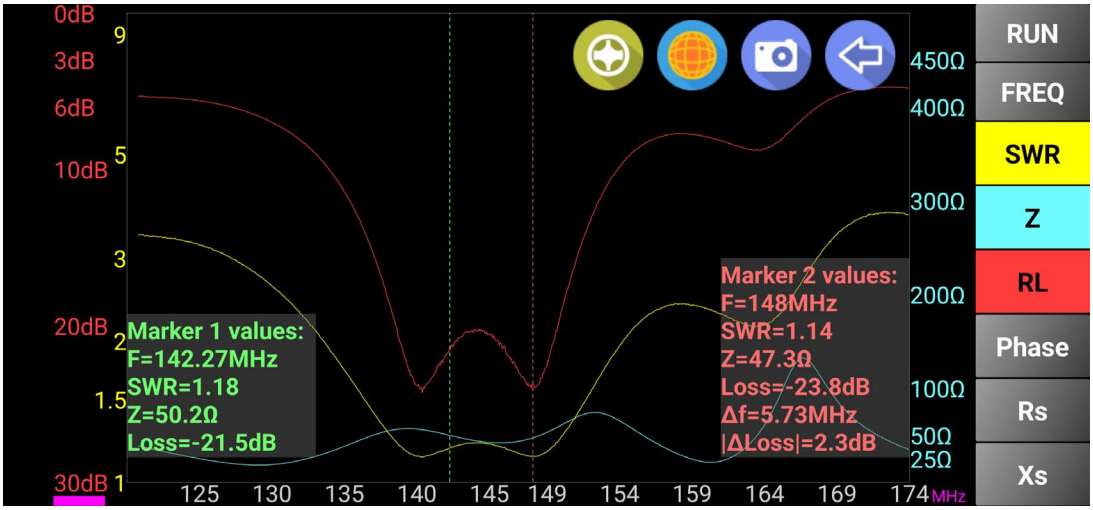
With 500 VDC Capacitor

Picture # 6



After Changing Capacitor to a 300 VDC Capacitor

Picture # 7



After Replacing L1 the Inductor that was smoked

Picture # 8

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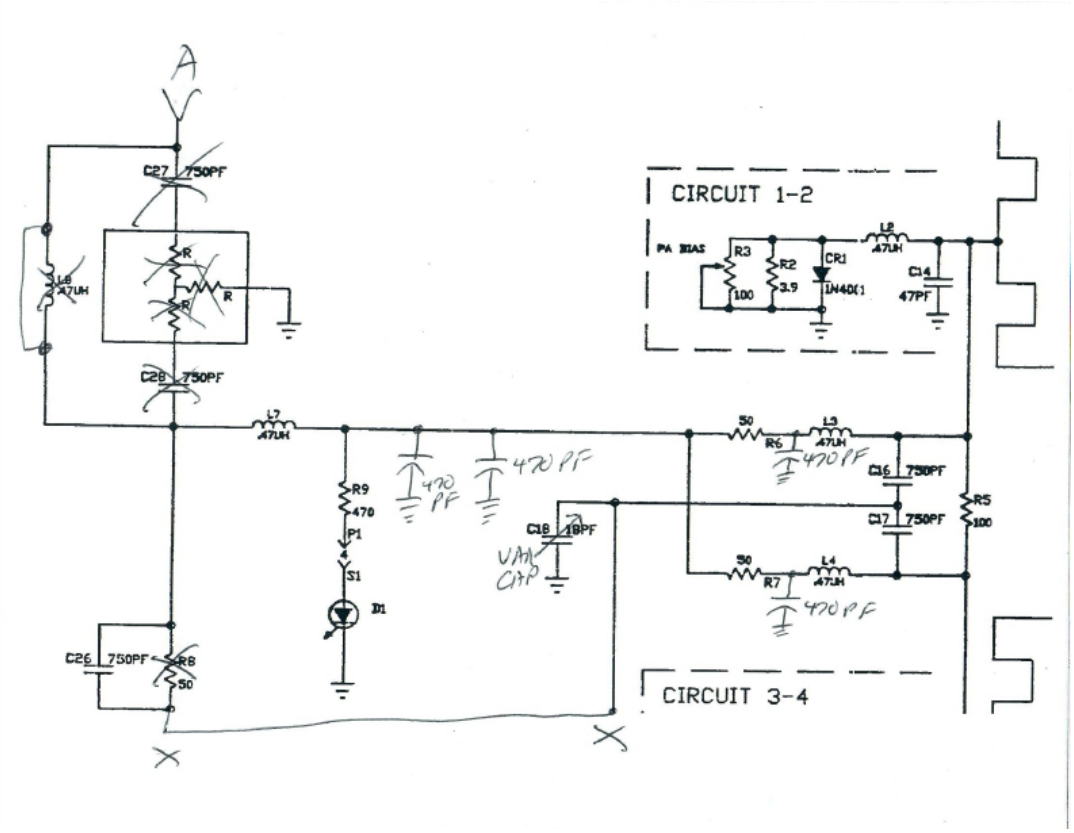
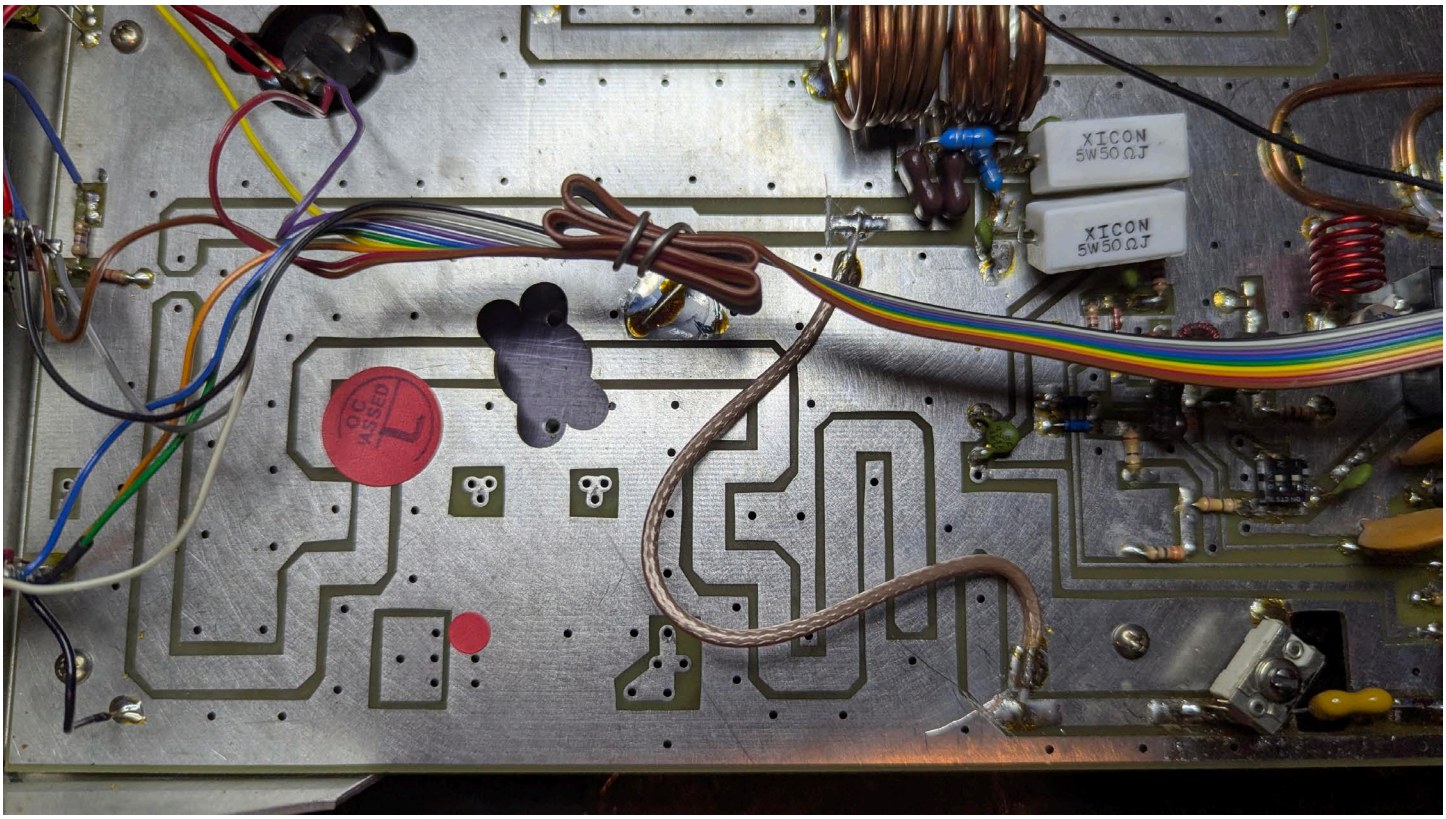


This image has the changes between the B-3030 and the B-5030.

Picture # 9



This picture shows the coax bypass of the driver section of the board.

Picture # 10