

The Trials & Tribulations Of Going Portable...

20 March 2011

The decision was made. "We" were taking the camper-trailer up to Woodgate Beach (in QG64gv for those who know about grid squares) , bordering Hervey Bay for a week for a short holiday. That was going to cause me problems because I like to get out portable for the John Moyle Field Day - that couldn't happen this year because at least part of it would be with us travelling back from our trip away..

The holiday being a "given", the next step was to make sure that not all of the long 'stick-y' things were fishing rods. My set of HF helicals do look like some of my fishing rods but have an obvious absence - somewhere to attach the reel. I also created a 1/4 wave whip for 6M SSB or FM, one that could be screwed on the same 5/16" antenna base, out of some 3mm bronze welding rod. (For those who are interested in this type of antenna, the length was 1430mm from tip to the bottom of the base fixture for operation at 50.1 MHz.) This material has no mechanical strength and certainly not enough to be used with the car in motion but ok for stationary use. The SWR curve is very wide and rises from about 1.15:1 at 50.1 up to 1.3 at 52.5 MHz.

The radio gear to be included was the Icom IC-706Mk2G, a LDG Z100 autotuner plus an optional DSE Q1755 12V/23A switch mode power supply, and a HF & VHF/UHF SWR meter.

I was interested in trying to work some JA's on "6" from this grid square. The 706 was set up in the car, running from the 12v car battery and connected to the 1/4 wave whip. I managed to work Remi FK8CP on the Monday afternoon but he reported distorted transmit audio and gave me a 3x1 report. That made me start wondering what was happening, particularly when coupled with the fact that I seemed to hear audio out of the speaker of the transceiver while transmitting. To say that effect was unusual would be an understatement.

Step one, try connecting the case of the 706 direct to car frame. No change.

Step two, disconnect the Z100 tuner from being in-line. RF power up but still some transmit audio being heard.

Step three, take the 706 plus Z100 into the camper, connect a 6m length of RG58 back to the car and power it off the 23A power supply plugged into the mains power supply. NO extraneous audio being heard BUT the RF power was down and the SWR seemed high, over 2:1. Given that the basic whip antenna SWR was just above 1:1, this was a bit weird.

Step 4, disconnect the Z100 tuner again. Tx power back up, SWR back down.

Of course this pointed at least part of the problem as occurring in the Z100 autotuner. As for the transmit audio being heard, was it really coming out of the speaker of the 706 or from the car radio wiring (even though turned off !) This latter question remains and I may follow it up at a later stage if I need to.

Ok, the tuner. I then did some transmitter tests with it connected it back in line and using FM to get a constant carrier power & hit the PTT button. The PO bar on the 706 showed 100 watts, as did the SWR meter between the 706 and the Z100, THEN about 10 seconds later, down went the PO bar to around 50% (ie 50 watts), up came the SWR to over 2:1. Hey, these tuners are supposed to tune out impedance mismatches - not create them.

I unscrewed the Z100 top cover, and touched around the toroidal inductors checking for any one hotter than the remainder.. the middle one was - L4. It was very hot. I was then wondering if I had a faulty relay in it. Where would I get another replacement relay ????? There wasn't much I could do there and then - it would have to wait for my return home.

It also became fairly obvious by then that you can't work much in the way of JA's on a 1/4 wave whip, not at this early stage of Cycle 24. I could hear some of them but the other home-based operators in Hervey Bay were working signals that were only just in my background noise and giving them 59 reports. Cross-polarisation loss is expected, but this was ridiculous... Any suggestions ???

I did have a possibility up my sleeve. I have often (in the past) used a 2M 5/8 wave base loaded whip on 6M for use while mobile. The 5/16" antenna base I had quickly retrieved from my field day box could be mounted either vertical (normal position) or horizontal (abnormal). I mounted it at the top of my solar panel mounting pipe (about 1.8m long), screwed on the 5/8 whip and used the 1/4 wave whip as a horizontal radial. SWR down under 1.2:1.... That would work as a vertical but I really needed to try horizontal polarisation. I flipped the antenna base to the side and the whole assembly became a pseudo-half-wave dipole. It gave about 1.3:1 SWR at 50.1 but at least it was horizontally polarised. I only managed to work a single JA station, Nori JH7XRZ, using this arrangement but it did demonstrate that it was better to plan on taking a dipole than trying to make one in situ...

I also had a few skeds on 7070/7075/7078 KHz and apart from "crashes" from storm activity being apparent on the band at the relevant times, the helical whip seemed to work well even though it's lowest SWR point was at 7098 KHz. And guess who forgot to take the set of Allen keys needed to adjust the length.. Gees, I felt dumb when I discovered that they were (literally) in the other car - the one at home.

This story doesn't finish quite yet. It was while operating on 7MHz on an 8AM sked that the transceiver was fine one minute then went dead the next. I was transmitting and when I let go of the PTT switch, the green receive LED lit but the S-meter scale was at FSD, no noise emanating from the speaker. Pressing the PTT again turned off the green LED but the red transmit one didn't come on. The SWR meter confirmed the absence of RF. In effect the radio was dead - the case was warm to hot - but nonfunctioning except the dial still showed, the VFO still moved the displayed frequency, the memories could be selected, as could the emission mode. I powered off the AC power supply briefly, and then subsequently for a longer time, but dead it stayed. After problems with the ATU, more problems with the radio itself was the last straw. The radio gear was packed up and stored in the car to be evaluated after my return home.

Disassembly of the radio covers in the workshop environment revealed that one of the clips that hold a regulator to the side case of the 706 frame was loose. In fact it fell off onto the table shortly after I took the bottom cover off. I re-tensioned and replaced it. The transceiver powered up normally on the bench. It received, transmitted, all operations were normal. I put it back into FM mode, 50 MHz, and the RF power meter showed 100 watts. I left the transmitter on at that power level for several minutes & all was ok - the RF power changed by about 2 watts over that time. I went into the RF power setting mode and adjusted the power back to 40 watts and then placed it into transmit again - this time for about 10 minutes. No issues arose, the RF power was steady even though the case was reasonably hot. The original "dead" fault was gone. Maybe it was that regulator shutting down.. I don't really know - and will just have to wait to see if it ever shuts down in a similar manner again...

I also took the opportunity to do some tests on the LDG Z100 in the workshop but this time into a RF power meter/dummy load. I confirmed that effects noted while we were away - some kind of heating effect was occurring with the result that the SWR presented back to the radio rose to > 2:1 on 50 MHz.. The confusing part about this was that it did it **even while it was in Bypass mode**. I even tried changing over the radio to the older IC-706 (a Mk1) and it showed the same outcomes. Direct to the RF power meter via the SWR meter, the RF power stayed around 100 watts on 50 MHz FM on either. Via the Z100, the SWR rose and the internal ALC in the 706 throttled back the RF output power, again, on either. I don't have a schematic for the Z100 but have emailed LDG the symptoms and asked for suggestions and a PDF of the schematic.

My conclusions are that there is a component in the inductor/capacitor/relay network that is getting affected by the application of RF at the 100 watt level and either getting lossy or is detuning (changing value) as it heats up. I have to spend a little time investigating the cause (and thus determine a remedy) and am really hoping that it is not RF loss in the PCB material itself. If it is, there is no cure.. To prove what is happening, I will have to either remove at least one toroidal inductor (more likely two) or one relay. Until I get a response from LDG, I am reluctant to do either.

The email back from LDG on their first working day after I sent my email request was quite short :

Hello,

Sounds like a relay going bad.

You may have to burn it up to find the one.

No schematic attached so it looks like I have to do it the hard way.... and that will have to wait for a few days so I have some time to really get stuck into it.

I will continue this article as more becomes apparent....

That followup is available on the web page **"Fixing" the LDG Z100** ([/~vk4adc/web/./content/index.php?option=com_content&task=view&id=118&Itemid=43](http://~vk4adc/web/./content/index.php?option=com_content&task=view&id=118&Itemid=43))

There is one lesson to be learnt from all of the above : thoroughly test ALL of the gear before you venture out for a holiday or for a field day event. Try it every which way, different modes, different power levels, maybe even different power supply arrangements. If it doesn't work under all combinations, fix it beforehand.

Just a few images from the trip : { mouse-over for a larger view }



This is the 5/8 2M whip (the black vertical section at the centre of the image) with the brazing rod 6m 1/4 wave whip as a tuned radial. Apologies for the cluttered background but you don't have a lot of options when located in a tree-rich park.



By this stage, the Z100 tuner had been removed from the top of the IC-706Mk2G transceiver. The physical size of the DSE Q1755 is a good match for the 706, and was "electrically quiet" as far as I could tell - no PWM "birdies" heard on 40M or 6M (other bands not checked). I just need to make/buy another short (200mm-300mm) DC power lead to a 6 pin Icom plug to make it neater. A piece of white cord was used to tie the 706 to the power supply so it could just be picked up as a single unit.



This is the 6m 1/4 wave whip on the front of the car (again hard to see because of the background, look for the brass colour leaning left). Note that brazing rod has little strength and once bent, stays that way. It might eventually get replaced by a piece of spring steel or stainless steel if I can find a source for a 1.5M length of 3.2mm diameter.



Slightly different front-on view of the above. Yes, that is the wash-up bowl on the right & tea and coffee containers on the left. Obviously the radio gear didn't stay there all of the time - it being prime "kitchen" real-estate.

Note the old-style logging method - paper and pen !!!!