2012 Spring VHF/UHF Field Day

24 November 2012

Near Mt Kynoch, Toowoomba, QG52XM

I thought that this one would be the best FD so far, weather permitting. It didn't quite turn out that way but I'm not really complaining. Wet weather was forecast – something fairly typical for FD weekends in southern VK4 – but it didn't actually rain at my chosen spot just north of Toowoomba, QG52XM. No rain is a big plus after all wet FD's for the last few years.

The trip from my home to this location is about 135KM and I arrived around 9.30AM, a bit later than planned. The FD starts at 11AM local (0100UTC) so that gave me about an hour and a half to set up. I was parked off the side of a dirt road (found using Google Earth) and it wasn't long before people came past eyeing the FD trailer and the antennas I was assembling. A few stopped and asked questions like "what was I doing?"and others just motored past, taking it all in visually. Actually, it was the re-appearance of one young fellow (Adam) that distracted me from the task at hand with some semi-disastrous consequences.

The antennas were up and the last stage was to add the equipment box taken from the back of the car, connect the coaxes and the power leads. The coaxes are all colour coded and it is hard to get them wrong. Not so the power leads. All of the positives connect to one terminal, all of the negatives to another. Being distracted by the visitor, I managed to reverse them. That is a big "OOPS". Smells, smoke, but thankfully no fire resulted when I flipped the main 70A circuit breaker from the battery bank. It didn't take long for the realisation as to what was wrong to come into my mind and the breaker was again manually flipped out.

The day that had looked so promising was now somewhat dimmed as I took stock of what did and what did not work. The IC-706MK2G used for 6M, 2M & 70cM was short-circuit on the power leads, as was the 23cM transverter, and the PICAXE-based rotator controller 'smelled'. The LDG Z100 tuner used on 6M was dead. Funnily, the older IC-706 used as the IF for microwave didn't suffer and neither did the 2.4/3.4GHz transverter box. I was on the point of dismantling everything and heading for home when I remembered that 706's have a reverse polarity diode arrangement inside, directly on the power feed point. I took out the bottom cover screws and checked the positive to negative incoming leads with my DMM on ohms – short ! I found the two protection diodes and cut one of the leads one at a time, and with the second diode's cut, away went the short. I carefully applied the 12V source again and was greeted by receiver noise – but had the PA devices been killed ?? I added the outgoing coaxes and pushed the PTT, whistled into the mic and had output on 6M. Band change to 2M and did the test again – yes, output there too. I put the cover back on, added the screws and put it back in service.

The 23cM transverter was next. I opened the diecast box, and again there was a short circuit (S/C) on the incoming power lead. It terminates directly onto the PA PCB and then a power wire feeds to the remainder of the circuitry. I cut this latter wire and the short remained on the PA PCB, but the rest was ok. I wasn't going to be able to fix this one easily and I suspected that the Mitsubishi RF power block (more $$$!!!) was the cause. I put the diecast lid back on and put it to one side. Maybe more time to consider it later. In the meantime, 23cM was out of the equation.

The rotator controller was issuing forth a bad smell so I just ignored it – to be fixed once back at home.

That gave me gear operating on 6M, 2M, 70cM, 2.4G and 3.4G – and that would have to do this time around. The antennas reverted to Armstrong style pointing, fortunately relatively easy to do when the mast tube is not locked tight to the inner rotator pipe, just like when you normally set the arrays to TN during the setup phase.

Of course, these equipment checks took time. By the time I was ready to operate, the time was 11.30 local (0130UTC). I started off on 2M SSB and worked from then on 6M SSB, 2M FM, 70cm SSB, 2.4G SSB etc.

About 1.15PM local, Phil VK4CDI and his XYL turned up to say "gudday" and have a look at the FD installation. Later, Phil and I worked on 3.4G SSB after working out the IF frequency errors at his end.

Roy VK4ZQ, at Mt Gravatt lookout, QG62MK, and I spent a lot of time trying to make contact on 2.4 (successfully) and then 3.4, but he could hear me there and I couldn't hear his exchange in the noise. The problem was that we couldn't figure out whether it was my receive sensitivity or his transmit power that was the issue – and we still don't.

The number of available contacts/calls diminished for a while so I spent some time powering up the 1296 transverter receive side, and a test with Ron VK4KLC proved that the receiver still worked, as proven over the 110Km path. It was cross-band from 2M to 23cM though, so no numbers were exchanged.

I spent some more time checking why the receiver noise output on 2M SSB was down as compared to the dual band whip (2M/70cM). I tracked it down to a short-circuit inner to outer in an in-line BNC female clamp-style coaxial socket used in the 2M yagi feeder path. I re-terminated it and all was back to normal – but then realized that all of my earlier 2M SSB contacts had been made via a S/C coax !!!

I also took the time to set up my synthesised test signal source along the road a bit and then checked the effective receive sensitivity of the 2.4G and 3.4G systems, by switching between 1133.5 and 1201.250 to give harmonics at 3400.500 and 2403.500 respectively. The signal meter on the 706 IF was within one “s-point” from one band to the other. That seemed to prove to me that, if Roy and I could work on 2.4 then we should have been able to work on 3.4G. Roy had already packed up by then so it wasn’t possible to re-try the tests with him.

I continued to work the various stations available on 6M, 2M, 70cM and John VK4JMC on 2.4G until Doug VK4OE came up about 7PM, again from Mt Gravatt lookout, QG62MK. We finally worked on 2.4 at 7.30PM and then 3.4 at 7.40PM. Doug runs 40 watts on this latter band, plus some serious antenna gain, and was S9+30dB on my meter. Obviously my receive setup does work on 3.4G, it just didn’t work well enough to make the contact with Roy VK4ZQ !

As soon as the 3.4G contact was completed, I backed up the VKCL data file to a USB stick, pulled down the antennas and packed everything away. The full pull-down took just over half-an-hour and I was ready to drive off for my 135KM journey home by 8.30PM.

One of the good outcomes from the day was the ‘life’ of the ‘new’ battery bank. I was using 3 x 92AH pre-loved batteries in parallel and at the end of the 8+ hours of operation, the terminal supply voltage was just under 12.6V… and I hadn’t run the little two-stroke generator at all. I was most impressed with that, and given that I have yet another 92AH battery to add, I should ‘power through’ the Summer Field Day on 14 (/15) January 2013 on batteries alone

I suspect that as well as missing the possible contacts on 1296 due to the PA issue, a number of FD operators did not think to beam west from Brisbane, or south-westerly from the Sunshine Coast areas towards Toowoomba, so some of my CQFD calls remained unheard.

No sporadic-E (Es) was noted on 6M during the afternoon or evening and there were a number of normally-regular FD’ers not heard on at all. Other field days have been virtually continually busy with contacts/stations to work, this one wasn’t.

One of the reasons for heading west this time, in lieu of my normal FD trip south to Beechmont Plateau, was to get away from the high tension powerline noise that has plagued my operations from that area. I knew (from Google Earth street-view) that there were HT lines along the main road to the west of me up here but initially they were relatively ‘quiet’. Later during the day, as the wind rose in strength, so did the HT noises on 6M, and even marginally affected 2M at one stage. The second reason for heading west was that I hoped to get a decent microwave path into Brisbane – not realising (at the time) that there was a higher mountain range (or two) between Toowoomba and Brisbane. Better planning is required for next time, although accessible and high sites clear of vegetation are very hard to find, even harder when you include clear microwave paths back to Brisbane.

For the record, this time around the setup was :

6M : IC-706MK2G at about 100W PEP SSB, 40W on FM – 4 el yagi, whip for FM

2M : IC-706MK2G at about 40W PEP SSB, 20W FM – 9el yagi (SSB) or dual-band SG7400 vertical whip for FM

70cM : IC-706MK2G at about 20W PEP – 15 el yagi

(23cM : IC-706 + transverter at 20W PEP - 26 el yagi – if it hadn’t been damaged)

2403.150 : IC-706 + transverter at 1W PEP – coffee-can feed to 24dBi gridpack

3400.150 : IC-706 + transverter at 1.5->2W PEP – coffee-can feed to (24dBi @ 2.4G) gridpack

Logging was done using VKCL V3.5 on a EEE PC, 10.1” screen, Win7, with a USB/RS232 adapter and a RS232/TTL CIV adapter, two NiMH batteries plus an optional 12VDC in, 19VDC out PWM-style charger, as required.

Points breakdown :

The initial 5 contacts on 2M, 6M and 70cM over the first 11 minutes were ignored to give just an 8-hour block for scoring.

Band	Locators	Locators	QSOs	Total	Band	Band **
	Activated	Worked	Made		Mult	Total **
50	10	30	21	61	1	61
144	10	30	15	55	3	165
420	10	30	16	56	5	280
1.2G	0	0	0	0	8	0
2.4G	10	10	5	25	10	250
3.3G	10	20	2	32	10	320
……						
					Final Total:	1076 **

** All points subject to confirmation by the contest manager.

Postscript :

On Sunday morning (25th) , I started to work through the damaged items. The IC-706MK2G had the reverse polarity protection diodes replaced, the Z100 autotuner required the replacement of a SMD MMBT2907 used in the power switching to the CPU, the rotator controller needed two 5V SMD 78L05 voltage regulators plus 4 NPN MMBT2222 SMD relay switching transistors replaced to make it work again. The bad smell emanated from a tantalum bypass capacitor on the incoming power feed, again replaced. The modified UPS (used to generate 50HZ for the two rotator motors) suffered a blown 40A fuse – it was replaced and the UPS then worked normally.

The 1296 PA fault (S/C) was traced to a SMD reverse polarity protection power diode that was damaged, the PA module itself was ok. The diode was replaced with a leaded style schottkey style, one that will be easier to replace given the original diode's mounting position in/behind the main "N" antenna connector.

Total repair parts cost – about $12, and of course, labour was free !!! The advantage of building a lot of your own equipment is that you know how it was built and how to fix it. You have diagrams and brain cells that provide information that is not always available when you buy everything commercially. Most of the repairs to everything were completed within about a 3 hour window on the Sunday morning. How long do you have to wait to get something fixed ??

There are a couple of morals to the story : #1 : get it right the first time (i.e. don't be distracted by anyone/anything) and #2 : use plenty of in-line fuses and make sure you fit (extra) reverse polarity diodes to every bit of gear you use ! (A blown fuse and a power diode are really cheap protection against reversed supply voltages.)

Prior to being packed away, all FD coax cables were examined visually and with an ohmmeter to check for opens and/or short circuits : I don't want to start the next event with damaged cables…

Here's hoping that I manage to get 5.7 and/or 10.368 going by mid-January !!!

And, by the way, I use a 145.150 IF for my current transverters = 1296.150, 2403.150, 3400.150…. and generate 1 watt PEP of RF out of the IC-706 at this frequency. I have heard of a few operators who use 432.150 as an IF and locals can hear the IF drive on transmit, and be heard on the IF receive frequency when they are trying contest exchanges directly on 432.150. Talk about unnecessary confusion as to what band those with these IF's are actually working on !!

Guys, move your LO so that your IF does not coincide with the 144.150-144.200, or 432.150-432.200, or 1296.150 – 1296.200 segments…

"Mouse-over" for larger images....

The back of the wagon showing the radio equipment "box" plus the 2.4/3.4 transverter box at RHS.

The FD trailer after the trip up to Toowoomba. The coax feeders are coiled and attached to the mesh sides with double-sided 25mm wide velcro strips.

Assembly of the 6M, 2M and dual 70cM yagis onto the rear masting pipe. The whole assembly has it's weight supported by the winch, and as the array is pulled vertical, the 2M and 6M yagis rotate so that they stay in the horizontal plane.

The operating position inside the trailer. Only a top silver polytarp was used with the fine weather outlook but the full-body one was ready and available if the weather turned bad.

The VHF/UHF array on the rear rotator mount.

The 23cM yagi on the top, along with a couple of whips - a 2M 5/8 plus a Diamond SG7400 dual band 2M/70cM - and then the gridpack with the 2.4/3.4 transverter mounted directly behind it and connected by 0.141 hardline. This pipe sits on the front rotator mount.

These three orange 92AH non-spill batteries provided the power for the full 8+ hours of operation. The old Willis power supply is used as a charger at about 12A and with the huge 240/24VAC power transformer, it doesn't seem to worry too much about the input waveform, so it works very nicely on the two-stroke generator.

The generator is under the silver cover, the 5L of 50:1 fuel is enough to keep it going for 8 hours.

The gridpack for 2.4 and 3.4 GHz, dual coffee-can feed, with 10mm square mesh added to the front using short nylon zip-ties. The green cloth tape around the outside is to stop the fingers/hands from getting cut by the mesh ends during handling.

A rear view of the gridpack.. The two 0.141 runs are sleeved in heatshink and pass through a slot in the mesh to attach to the top of the transverter housing.

This time around, the coffee-can feed shows the results of having been optimised for best return loss, as evidenced by the extra tuning screws on both the 2.4 and 3.4 GHz sections. The orange conduit is 25mm O/D, the yellow material is cut from an old kitchen chopping board.

The feed mounting method onto the rear mounting plate : 2 x 20mm full saddles around the 27mm aluminium tube, held in place with 3/16" screws and nyloc nuts. The metal tubes between the wingnuts and the mounting plates are to minimise the number of turns needed to tighten them. There is a single self-tapping screw right towards the back that holds the feed at the correct length and orientation.