

HUSTLER 5BTV VERTICAL AND THE MARATHON

by Christopher J Page, G4BUE

When June and I arrived at our QTH in Florida in October 2004 we had to spend about six weeks clearing up the back garden from the debris caused by the three hurricanes that hit Sebring in the summer. The debris included the two 60 feet pine trees that had been growing at the end of the garden when we had left Sebring in May to return to the UK for the summer. I had been using the trees as supports for my LF wire antennas and now they had gone, I had to think of something to replace them. Since purchasing my first Elecraft K2/100 in December 2003, I had been thinking of getting a second one to enable me to try SO2R (single operator two radios) for contesting. When I ordered my second K2/100 in November, it meant that in addition to replacing the LF antennas that had been held up by the pine trees, I would also have to find a second antenna for all bands for the second radio. I have a two element five band quad for the HF bands (10, 12, 15, 17 and 20 metres). Back home in the UK, I had been using multi-band Butternut verticals for years and was aware of their excellent performance. However, after unsuccessfully bidding for a couple of used ones on e-Bay, I decided I would have to buy a new one. The price of the basic HF6V Butternut in the USA is about \$340 (I would not need the HF9V with the WARC bands as I only intended to use the second antenna for contesting on the main bands). Before spending \$340 though, I decided to look at other options and when I saw an advertisement by DX Engineering in the January QST for a Hustler 5BTV multi-band vertical for \$139 (about £75), I decided to research this antenna further, especially as I had also seen an advertisement for the same antenna in the January edition of RadCom by Waters & Stanton for £199.95! A check of the Newtronics Inc web-site at http://www.new-tronics.com/main/html/base_hf_5_band.html showed the Hustler 4BTV vertical described as a “Full band coverage on 10-40 metres (1.6:1 at band edges typical). Solid one inch fibreglass trap forms for optimum mechanical stability. Heavy gauge aluminium with stainless steel hardware construction throughout. Feed with any length 50 ohm coax”. It is 25 feet and one inch tall and can be installed “Ground mount with or without radials, roof or tower mount with radials” and will accept power to “full legal limit CW and SSB 1000 watts”. The 5BTV model adds 80 metres by the addition of a resonator, spider assembly and telescopic whip to the top of the 4BTV model, adding about four feet to the height. The antenna allows multi-band operation through the use of individually tuned “Q” traps (one for each band) which are parallel tuned circuits providing isolation between the vertical sections. It is constructed of heavy duty aluminium and has stainless steel hardware. The use of clamps permits readjustment if necessary and peaking for each band. I read a number of reviews on eHam about the 5BTV, and they seemed generally positive and so I decided at well under half the cost of the Butternut, that I should try it. I made the order to DX Engineering on the Internet and the antenna arrived within a week from their premises in Ohio. The antenna was well packaged and all the parts clearly identifiable with the clear and concise instructions. An inventory showed all the parts were present and appeared to be of good quality, and I made a thorough read of the instructions before attempting to assemble it. I have been using verticals for many years and am therefore aware of the importance of installing a good radial system underneath each one. Therefore, I was somewhat surprised to read in the instructions that for optimum performance of the 5BTV, Hustler recommend it be mounted on a roof with two radials for each band, cut exactly to the measurements given (a quarter wavelength for each of the five bands). The radials should slope down at 45 degrees from the base of the vertical and be equally spaced around 360 degrees with those for each band opposite each other. I had no intention of mounting it on a roof, or high above the ground, even if I had the means to do so, and therefore read the next page with interest. This said that the second choice is to ground mount the antenna with radials (the same two radials for each band as with roof mounting). In this situation, the antenna is fixed to a ground post, which it is recommended is a four feet metal stake about 1.25 inches inside diameter so that the base of the vertical is about four inches above the ground. The “least desirable” option for mounting the antenna is to ground mount it without radials in

which case you install it on a four feet ground stake driven into the ground with 18 inches protruding. Finally, and almost as an after thought, the instructions say, "Adding more pairs of radials than the two per band prescribed in the instructions, may result in obtaining better results for DXing". I decided to build the antenna and mount it on the ground and then, and really against my better judgement, just use two radials for each band as described in the instructions for the second choice. At the same time I asked FOC members via the FOC Reflector for their experiences using the 5BTV and whether adding additional radials resulted in better performance. A four feet steel stake was acquired for the ground post and after this had been placed vertically in the ground (sand in Florida!), the mounting bracket (which comes preassembled) was fixed to it with two U bolts. Construction of the vertical was simple and straightforward with each of the five traps being inserted into aluminium sections and held in position with hose clamps (Jubilee clamps in the UK). When I had finished, it was a very



The Hustler 5BTV erected in Chris's back garden (yard) in Florida.

easy matter to hold the antenna vertically next to the mounting bracket, lift it about eighteen inches and slide the bottom over the top of the mounting bracket. The hose clamp holding it in place was tightened and there stood the 5BTV looking just like the picture on the web-site! Meanwhile, members had been replying to my request for information about the 5BTV on the FOC Reflector and I am grateful to K5CA, K7NJ, KF7E, KL7HF, KZ5D, N4OO and NØSS for sharing their experiences with me. The general consensus of their opinions was, like mine, that it is better to use a vertical antenna with the maximum number of radials you can install. I therefore decided that I would first install the 5BTV with the recommended two radials for each band but was prepared to increase this depending on results. I cut the radials, two for each band, and attached them to the mounting bracket. I calculated that the lengths given for the radials in the instructions were designed for the centre of each band as a compromise between SSB and CW operation, and as I am only interested in operating CW, I re-calculated the length of each pair of radials for 3535, 7025, 14025, 21025 and 28025kHz. The instructions recommend decoupling the transmission line to prevent it acting as a radial by making a coil of 10 turns about six inches in diameter within eight feet of both ends. Fortunately the length of 52 ohm RG-213 coax that I had acquired for the transmission line was long enough to enable me to do this, and I

was then ready to see where the antenna resonated on each band. My MFJ-259 antenna analyser made it very easy to do this and I quickly found the 5BTV resonated at 28113, 21090, 14066, 7265 and well below 3500kHz. Adjustment of resonance on each band is achieved by loosening the hose clamps and adjusting the distance between the traps and vertical sections of the antenna. Ten metres should be done first, then 15, 20, 40 and 80 metres as adjustment of the higher bands affects the lower bands but not vice versa. I was able to adjust the distances between the 10 and 15 metre traps without dismantling the antenna by using a step ladder, and quickly had it resonating at 28018 and 21012kHz. Lowering the main part of the antenna to the ground to make adjustments for 20, 40 and 80 metres is quickly and

easily achieved by loosening the hose clamp holding the vertical to the mounting bracket and lifting it upwards, after first marking the position you have adjusted it to for resonance on 10 metres. I was quickly able to adjust it to resonate on 14025kHz but then I ran into a problem. You have to lengthen the 40 metre part of the vertical section to lower resonance on 40 metres and even when I lengthened it to its maximum, I was still only able to bring resonance down from 7265kHz to 7123kHz, which was still much too high for me. I decided the only thing I could do was to add an extra length of aluminium tubing to



The extra section between the hose clamps (jubilee clips) that Chris added to the 5BTV to enable it to resonate on 7025kHz.

the 40 metre section to give me more adjustment. A call was made to N4TO, ten miles away for permission to raid Vic's pile of spare aluminium tubing. Two hours later I was back home and after some cutting with a hacksaw and the use of an extra hose clamp, I had inserted an additional 12 inch section into the 40 metre vertical section. I was then able to quickly resonate the antenna for 7026kHz by adjusting the overall length of the modified 40 metre section and by adjusting the length of the top whip section, quickly had it resonated for 3527kHz. I re-checked resonance on the other bands and it had not changed. Apart from having to install the extra piece of tubing to the 40 metre vertical section, it was really very quick and easy to resonate the antenna on my desired frequencies. The SWR at resonance on 10, 15 and 20 metres was very good and easily covered the whole of the CW section of each band. However, on 40 metres I was unable to achieve anything under an SWR of 2:1 and 1.7:1 on 40 metres. I decided to add eight more radials, all cut for a quarter wavelength on 80 metres, and this reduced the SWR on 40 and 80 metres to 1:1 without changing 10, 15 and 20 metres. I then decided to add some more radials for 40 metres and cut and installed 14, each a quarter wavelength long. To my astonishment this caused the SWR on 40 metres to rise to 1.6:1 at resonance and to 1.15:1 on 80 metres. I disconnected them but having cut them decided I would still try and use them and so I joined pairs together to make seven 80 metre radials and connected these to make a total of 17 radials for 80 metres. This resulted in the SWR going back to 1.1 at resonance on 80 metres but being 1.2:1 on 40 metres. I finally disconnected and discarded the extra seven 80 metre radials and kept the two for each band as given in the instructions plus the first additional eight radials for 80 metres. Unable to think why the extra radials would have such a detrimental effect on the SWR at resonance, I decided to try the vertical on the air as, after all, that is what counts at the end of the day - how well does it perform?



The base of the 5BTV showing the ground post, mounting bracket and decoupling coil.

By this time it was getting near the end of January and the Marathon was fast approaching. I was due to operate as W4/G4FOC and as this was the first time G4FOC had been QRV outside the UK and QSOs counted double points, I wanted to put on a good show and put out a decent signal. Since losing the pine trees and my supports for the LF antennas, I had resorted to using my 132 foot centre-fed with open wire feeder hung below the quad about 32 feet and tuned through an ATU for 40, 80 and 30 metres, but wanted something better for the Marathon. With the help of G3PDL, when Diane and Pete had visited us in December for the Florida Dinner, I had acquired a 30 foot Rohn 20 TV tower that a neighbour had lost in one of the hurricanes and wanted dismantled. I installed this at the side of our house and by inserting 20 feet of piping in the top, had a support to hold wires up at 50 feet. I used this to hold an inverted vee for 160 metres and about four feet below it an inverted vee for 80 metres. I decided to use the 132 centre fed with the ATU on 40 metres to enable me to quickly switch between antennas for fast band changes without having to re-tune the ATU. I had purchased a Top-Ten Devices DX Doubler and had hoped that my second K2/ 100 would have been finished in time to enable me to try SO2R for the first time in the Marathon. I had also decided to try using N1MM's contest Logger program for the first time. I thought that as I was running W4/ G4FOC, and not competing against anybody, this year's Marathon would be a good opportunity to experiment a little and try new things. However, it was not to be for SO2R as I was unable to finish building the K2/100 in time. I therefore decided to use the 5BTV as a back-up and/or alternative antenna for the

Marathon. I have competed in the Marathon from the UK every year since my first one in 1977 and know that you are always able to make QSOs on bands and paths that you would normally struggle to make during normal operating. I have put this down to the fact that, unlike any other contests, there are only a restricted number of stations (500 in theory) that you can work on each band in the Marathon and FOC members are generally very good operators and very skilful at digging out really weak signals to make those five and six banders. The Marathon starts at 4pm local time in Florida and sunset was about 6.15pm. Soon after the start of the Marathon, I quickly realised that HF conditions were pretty poor and at 2125z (4.25pm local time) I decided to check 40 metres in case there were any east coast USA stations coming through. I was amazed to hear GI5LP at good strength. It was bright sunshine outside and almost two hours before our sunset. I was using the 132 feet centre-fed and when I switched to the 5BTW, Lionel came up an S point. A quick call and he was in the log at 2128z for my first 40 metre QSO. I then got ambitious and started calling CQ and at 2131z GM3POI answered me. Clive was not his customary 599 though and a comment to that affect resulted in him saying he was running QRP! Between then and 2209z (still an hour before our sunset) I had ten Europeans (amongst a number of USA stations) answer my CQing plus C56C, all whilst using the 5BTW. I made a mental note to check 40 metres a bit earlier the following day. I found the 5BTW worked very well on 15 and 20 metres, especially when I was searching and pouncing and had the quad pointing in a different direction to a member I wanted to work. They were usually louder on the 5BTW making it easier to work them without having to wait for the quad to rotate in their direction. When the station I wanted to work was in the same direction as the quad, there was usually a difference of some four S points between the quad and the 5BTW. I also found it useful when CQing when 15 and 20 metres was open to Europe, to switch between the quad and the 5BTW, and this often resulted in a USA station calling me on the 5BTW. I went back to 40 metres at 2308z and had a steady stream of European members answer my CQing and then at 2330 I switched to 80 metres. A quick tune around showed that USA stations were generally a little stronger on the inverted vee than on the 5TV, but then I heard 5B4AGN calling CQ. Bob was stronger on the 5BTW and this was proved when he answered my call the first time. Not a bad QSO for the first one on 80 metres with the 5BTW, I thought. I then worked LY2PX easily, who was also stronger on the 5BTW, before I went back to 40 metres. I went QRT at 0806z well satisfied at how well the 5BTW had worked on 40 and 80 metres. At 2122z the following afternoon (two hours before our sunset) I was back on 40 metres with the 5BTW and worked DK4LX at 2128z for the first European, quickly followed by GM3YTS. Between then and 2210z (still an hour before sunset) 11 more Europeans answered my CQing, including several who I knew were using quite low and somewhat inefficient antennas. I went QRT at 0724z the second night, and again went to bed very well satisfied with the way the 5BTW had worked on 40 and 80 metres, the latter band including a QSO with 9J2BO. For some reason I had missed having a QSO with G3SJJ on 40 metres and when I came across Chris during Sunday on either 20 or 15 metres, we made a sked for 2055z (five minutes before the end of the Marathon) on 7033kHz to try and complete our five bander. I went to 40 metres with the 5BTW at 2040z and worked a few USA stations while calling CQ to await the sked with Chris. I was amazed when he called me, very loudly, at 2052z and was even more amazed when two minutes later 5B4AGN called me, even louder, to complete a five bander with Bob as well. A final European QSO with GW3YDX at 2057z followed by one with N3RD and it was time to QRT. I am more than pleased with the way the 5BTW performed in the Marathon, especially on 40 metres, while running about 500 watts. I know that members using Yagis and four squares, will probably not be so impressed with my QSOs but when you consider the antenna cost only \$140 (£75) and stands just over 31 feet high, I think even they will agree that the 5BTW is excellent value for money in to-day's amateur radio market. My only regret is that due to UK import tariffs and taxes, and more greed for profit by UK amateur radio dealers, the 5BTW is over two and half times more expensive in the UK than in the USA. I really cannot understand this large difference, especially when one considers how the Dollar has weakened against the Pound recently.