Modifying The Conifer Grid Pack Feed

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I bought a "24dBi Conifer-series grid pack" antenna through eBay some months back but for either amateurs who want to use them at 2304 or 2403 MHz, or even for wireless LAN (WLAN) use, they cannot be used as supplied. The feed units on these devices contain a frequency down-converter and were originally designed (and supplied for use) with MMDS, Multipoint Microwave Distribution Services operating at about 2230 - 2250MHz.

These down-converters have to be removed from the original feed housing and replaced with a conventional coaxial feed. There are a number of existing conversion schemes for modifying these units, and after actually opening mine up, decided to do the job marginally differently. I subsequently found that the article at http://freenet-antennas.com/PHP-Nuke/modules.php?name=News&file=article&sid=7 (http://freenet-antennas.com/PHP-Nuke/modules.php?name=News&file=article&sid=7) was very close to my approach, others not so close.

This is the typical feed construction - a plastic moulding with an "f-connector" on the RH end, and a reflector attached to the LH end.

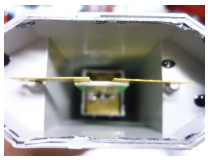
I chose to retain the original dipole element plus the end of the PCB, leaving it mounted on the original diecast metal frame. What this does is to ensure that the dipole remains at the focal point of the (grid pack) "dish".

The reflector mount can be removed from the end of the moulding - it is glued on.

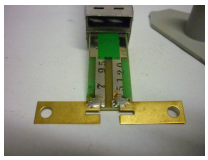
The modification process is actually quite simple once you have the reflector-mounting plastic moulding separated from the end of the housing. I used a sharp knife blade heated with a soldering iron to ease one end of the housing up a bit and then was able to prise the remainder off from the glue that was holding it together by judicious use of a flat-blade screwdriver.

This view shows the retaining nut has been removed. The washer is sticking in place due to the glue/sealant in the hole in the metal end piece.

The hex retaining nut at the feedpoint F-connector plus its washer need to be removed. Then pushing the F-connector body against a substantial surface allows you to develop enough force to push the feed unit back up through the plastic frame. The task here is to break the glue sealant around the F-connector where it goes through the hole in the metal section at the bottom of the moulding. A word of warning - do NOT try to pull it out by holding onto the dipole.

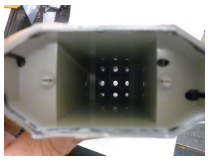


Looking down inside the body of the feed unit.



This is the dipole plus the balun section of the PCB.

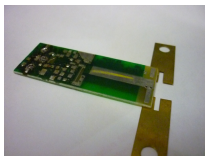
Once you have it moving, use a Philips screwdriver to continue to push the whole internal unit out, at least until you can grab the diecast frame.



Looking down inside the plastic moulding with the assembly removed.

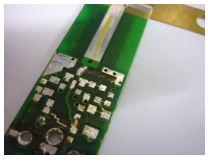
Remove the PCBs from each side by removing all of the little Allen-screws then heating the joining points on just one PCB, preferably the oscillator one, and levering it up until it pulls free. If you damage the oscillator board, (the shorter one), that doesn't matter as you will be discarding it anyway.

The long PCB - the one with the dipole at the end - now needs to be cut somewhere the body side of the last Allen screw - leaving that one so that the end PCB piece can be remounted back onto the frame. I used tinsnips and just cut straight across.



This is the "cut-off" section of PCB plus dipole.

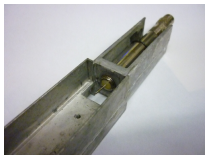
The SMD devices are removed from this end piece, discarding them. Clean up the solder on the PCB with solderwick or similar. There is no real need to remove any PCB pads; they just need to be cleaned off to remove obstructions for the coax that will be added.



The centre frequency of the dipole needs to shifted up from around 2.25GHz up to 2.3 or 2.4 GHz, a move of 2.5% or 7-10% respectively, and that means shortening the total dipole by that amount, Whether you use the 2.5% or 7% figure will be determined by your anticipated use : use 2.5% for 2304 MHz, use 7% for 2403 MHz and around 9-10% for WLAN use. Measure each dipole piece accurately, mark out **HALF OF** 2.5% (ie 1.25%) (or 7% (ie 3.5%) or 9-10% (ie 4.5 to 5%)) and cut with old scissors (or small tinsnips) & repeat for the second half of the dipole. The two halves then make up the total shortening percentage, 2.5%, 7% or 9-10%.

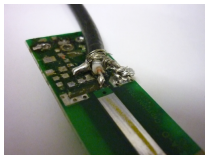
By rights, the balun section might need to be shortened for 2403 and WLAN use, and this can be achieved by soldering a shorting strip - eg a thin strip of tinplate - across bottom of the balun section. This has the effect of effectively shortening the parallel tracks section on the back of the PCB material by the total percentage : 2.5%, 7% or 9-10%.

Now we need to prepare the diecast section. The aim here is to remove all of the "F" fitting inside pieces to leave a hollow tube. I found that multi-grip pliers worked well for me in removing the end tube piece. All of the insides are pushed out through the tubes (a philips #1 screwdriver works well here..) and then the hollow outer tube is screwed back in place.



This is after the PCBs have been removed from the diecast frame. The internals of this coax line section need to be removed from inside both pieces to clear them out.

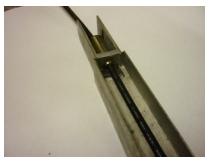
I used a short length of RFI 9006 Celfoil coax cable (an RG-58 sized, low loss foam series, around 0.6dB/metre loss @ 2.4 GHz) passed up through the ‘previously an F-connector' body and up through the diecast frame, stripped off a very short piece of outer and soldered the inner and outer at the end of the balun section - as shown in the photo.



The 9006 cable soldered at the end of the balun section.

Use just one of the small Allen screws and re-mount the PCB with dipole back on the end of the diecast frame.

The unterminated end of the coax is then fed down through the housing and the whole diecast assembly then fed into that, correctly oriented so that the modified dipole will seat back into the two slots in the plastic moulding. Remember that the main diecast section will hold the assembly in place if the dipole doesn't sit properly because it isn't long enough.



The coax is fed down the tube, the closest end is terminated on the balun/dipole PCB and the other end will later be terminated in an N or SMA series connector. I placed a nylon tie through a couple of suitably-sized holes part-way down the diecast body too to take any coax pulling-load pressure away from the termination on the PCB.

The retaining nut and washer are then replaced on the original F-connector body and the frame will be retained in place.

The plastic reflector-mounting moulding is then re-glued to the top and all is done.

Re-mount the feed assembly back onto the grid pack, connect your feeder to the N or SMA connector and it's is ready to use.

The antenna is now a passive dipole type, with a mini-corner reflector, feeding the grid-pack dish, suitable for your amateur or WLAN use...