DFS Construction Notes

This sheet is to provide some basic constructional information for the G4HUP DFS PCB – if you are already an experienced microwave constructor, and familiar with using SMD components, then feel free to pass on this one!

Making it Easy..the hardware:

I have found from experience that assembling this type of board is easiest once the PCB is mounted into the box enclosure, so the first operation should be to prepare the box.

Mark and drill the two end walls (input and out) and the side wall for the DC feedthrough (and external input SMA if necessary). See the sketch below for guidance on dimensions.

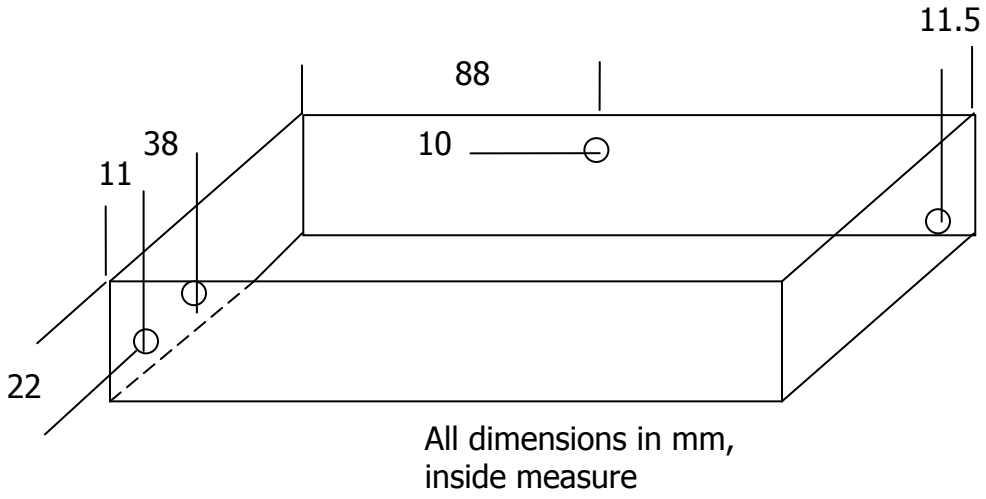

Fig 1 – Sketch of drilling dimensions for box walls

Assemble the box (dry) into one of the lids, and check that the PCB fits nicely – if necessary, use a file to 'adjust' to fit.

Seam solder the corners of the box.

Mount the SMA sockets – if you use the 'launcher' type, the PTFE insulation will fit through the hole in the box wall and hold it in place while you solder the flange down. You can trim the PTFE off the probe once it is soldered. Make sure the probes of all SMA's are at the same level in the box!

Mount the PCB into the box and tack solder in two or three places – so you can still adjust it and get it right!

Once you're happy with it, seam solder the PCB to the box wall all round.

Solder the feedthrough capacitor into the box wall, and link it to JP1 on the PCB.

Building..

I recommend that unless you are confident about the filters you are using that you build each of those next and test them. You will need access to a signal source at the filter frequency and either a power meter or spectrum analyser. Check that you are happy with the result, and make any necessary modifications – knowing that the filters are right is half the battle.

Assemble each stage in turn, starting with the voltage regulators, and test as go along.

It will help your final adjustments if you peak up each stage as you progress. Low frequency stages can be looked at with an oscilloscope, and tuned for best sine-wave shape – however, it is better if you can get access to a spectrum analyser.

Final optimisation of the output, once all construction is completed really should be carried out on an analyser, since the most important part is to reduce the levels of the output spurii to a minimum, and balance up their symmetry about the wanted frequency. Only in this way can the cleanest output be obtained.

Specific Comments:

The tabs of the voltage regulators should either be soldered to the walls of the box, or bolted, to allow for heat dissipation.

If you are using unshielded Toko or Coilcraft coils for filters F1 and F7, then install an internal shield in the box to eliminate any chance of stray coupling between them – if not, you may find that the spurious output level is higher than necessary.

If you do not need any stage, ensure that you do connect the output of the previous stage to the input of the next manually - I know, I shouldn't need to say this but....

Similarly, if you are not using an attenuator, make sure you replace the top resistor with a wire link!

Note that for MAR6 MMIC's the input is marked by a chamfered end to the lead. This is also true for the MAV-11. The dot on the MAV-11 indicates the OUTPUT!

See Rewinding Toko 10K Coils for information on this task.

Make sure the pins on the mixer packages are not bent or distorted – the clearances in the PCB are perhaps a bit less than ideal, and so they are quite a good fit!

The coils in F1 and F7 can be any Toko S18, MC117, MC120, or Coilcraft Unicoil 10 or Slot10 series. Some of these versions are available without screeing cans, other with – so you can take your choice on what is available locally.