NERG NEWS

August 2024

North East Radio Group Inc
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Incorporated 1985 Victoria Reg No A0006776V
Affiliated with the WIA
Editor – Greg VK3VT

Contents

NERG Net

The NERG NET will be on non-meeting Thursday evenings on the VK3RMH 70cM repeater. That is 433.325MHz repeater input with 91.5Hz CTCSS. Set your receive frequency to 438.325MHz. 8:30pm. You can also use the 9700 remote to take part.

HF REMOTE STATION NEWS

We have installed the new computer that was funded with a grant from the Banyule Council on the HF station. Some users have discovered that they cannot now log into the remote. We have found that they are using "Favourites" in RCForbe you need to delete the Favourite and then find the VK3CNE remote in the list of stations and log into it.

WHAT'S ON THIS MONTH?

Monthly meeting

Thursday 8th August - 8PM

Our Annual General Meeting

The purpose of the meeting is to receive and approve reports from the committee, including the financial reports; elect a new committee, authorise them to operate the accounts and set the annual fees.

Every Thursday afternoon – Radio Café

At the hall – Commencing at 2:00pm

Come along and play with the radios, have a chat and a cuppa.

Forth Tuesday of the month – Gainfully Unemployed Group

Please let Jim know if you are coming to the next one on Tuesday 27th August 2024

If you would like to be a member of the mailing list for this group please request membership on groups.io the group name is nerg-gug.

Kit Building and Testing plus Foundation Training and General Assessment Day

Saturday 24th August 2024

Training commences at 9am, if you would like to attend or undertake an assessment for any licence class please let us know at vk3cne@gmail.com or

training@nerg.asn.au

Kit day starts around 10am lunch may be available.

A Modular 6cm Transverter

Part 1 Overview and Design

By Paul McMahon VK3DIP

The next Band I want to get some capability on is 6cm or 5.76GHz. This can be a difficult band around town because it is impacted by the increasing use of 5GHz WiFi. Having said that, the sharing with WiFi also brings the positive that there are lots of bits available targeted at WiFi use.

Introduction – What is a Transverter?

A Transverter is a box that goes on the end of a normal (usually lower power) transceiver that linearly converts the Transceiver transmitter output (typically) up in frequency to another band, and the incoming signals on that same other band (typically) down in frequency to match the transceiver receiver. The linearly just means that apart from the frequency changing (usually a fixed addition) all else stays the same ie. you put FM in you get FM out, SSB in gives SSB out, and so on.

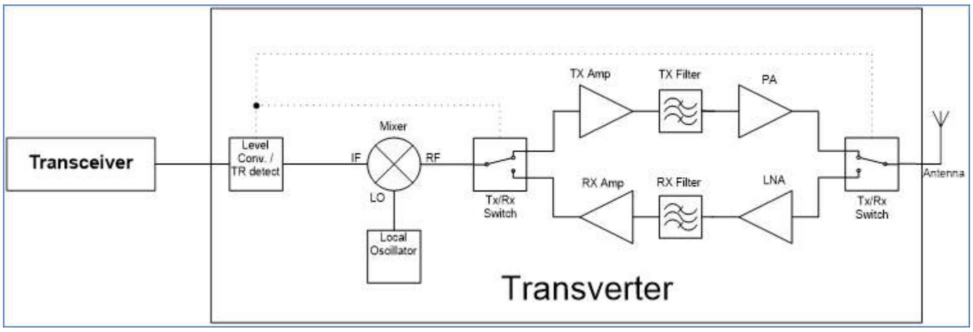

Figure 1- Generic Transverter Block Diagram

A block diagram of a generic transverter is shown in Figure 1, this is basically what I intend to build for 6cm. Most transverters follow this model with occasional minor variations. Sometimes the first Tx/Rx switch is moved to the other side of the mixer, but in this case two mixers are needed, one for the Tx path and one for the Rx, plus the Local Oscillator must supply enough drive for both mixers. The extra complexity of this option usually outweighs the advantages of operating the first Tx/Tx switch at the usually lower IF frequency. Note this Transverter model is half-duplex just like the majority of Transceivers that would be used to drive it. i.e. it can only be operating in either Tx, or Rx not both simultaneously.

Functions of the Various Modules.

- Level Convertor/TxRx detect.
  - Detect the state of the transceiver (Tx or Rx), using either a separate control line, phantom voltage detection on the coax, or carrier level detection.
  - Absorb excess Tx energy and attenuate to a level suitable for input to the mixer.
  - Control the Transverter Rx/Tx switches.
- Mixer.
  - Usually bidirectional (works for TX and Rx) and double balanced to attenuate the local oscillator frequency at either the IF port (Rx case), or RF port (Tx case).
  - The RF port must cover the desired frequency band.
  - The LO port must cover the designed local oscillator frequency.

- The IF port must cover the Transceiver frequency.
- Usually LO + IF = RF, or IF = RF - LO

- Local Oscillator.
  - Clean stable signal at sufficient level to drive the mixer.
  - Possibly locked to external reference.
- First Tx/Rx Switch.
  - Relatively low loss at final frequency.
  - Reasonable Isolation between on and off channels.
  - Relatively low level
  - As an Alternate - W1GHz transverters use a passive splitter here for simplicity.
- TX Amp .
  - Amplify the result of the mixer LO + IF .
  - Have high gain at TX freq. (5.7GHz).
- TX Filter.
  - Pass/Low loss at TX frequency (LO + IF).
  - Reject image at LO – IF
  - Reject unwanted harmonics.
- Power Amp. (PA).
  - Amplify TX signal to higher power level.
- Second TX/Rx switch.
  - As for first switch but at a higher power level.
  - Cross talk needs to be lower than first switch.
- Low Noise Amplifier (LNA).
  - As low a noise figure as possible at the RX frequency.
  - Gain at RX frequency.
- RX Filter.
  - Pass/Low loss at RX frequency.
  - Reject out of band signals.
- RX Amp.
  - Have high gain at TX freq. (5.7GHz).

Notes.

To achieve the required filter shape it may be necessary to have multiple Filters possibly separated by additional amplifiers.

The 6cm Band

The diagram showing the Australian 6cm band from the WIA band plan is shown in Figure 2

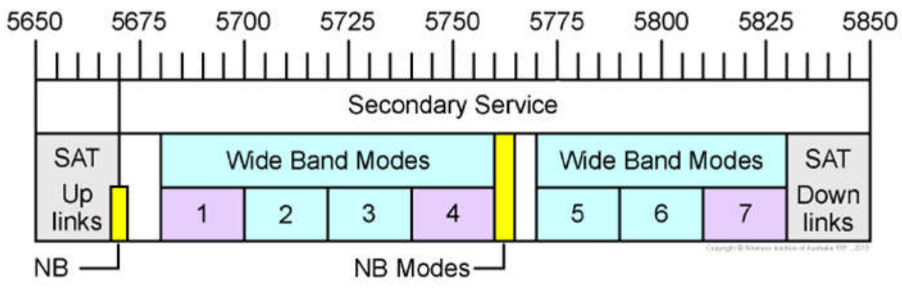

Figure 2 - The 6cm Band

The section of the band I am primarily interested in is the 5 MHz Narrow Bands Modes segment from 5760 to 5765 MHz shown in yellow in the diagram. Other segments are of course also possible but some of the design decisions bellow may need to change.

Design Decisions.

The first design decision as highlighted in the title is a modular design, i.e. pretty much each of the blocks in the diagram will be a separate item. The alternative would be some form of single board design as used in many commercial transverters. While a single board design would undoubtably end up quite a bit more compact, it is much more dependent on the design being perfect. I don't have the expensive commercial CAD tools to be confidant in that side of things, so sticking with a smaller modular approach means I can easily swap out sections, add more amplifiers, try different filters, and so on, without having to wait for a new PCB.

The next decision to make is what IF frequency on the Transceiver to use. For a start for a microwave transverter you want something with at least a few Megahertz tuning on the transceiver as the microwave bands are quite wide. The traditional alternatives would be for 2m or 70cm. 2m has some advantages especially at the lower microwave frequencies, notably that possible harmonics of the IF in the specific microwave band are at a lower level (higher harmonic number), conversely 70cm has the advantage of not requiring the TX filter to be as narrow to reject the image (LO – IF) frequency.

At 5.7GHz the high harmonic of a 70cm IF (13th) is not too much of a problem, and as most of my other transverters operate at 70cm I will stick with that.

Flowing from the choice of 70cm and given that I want basically the narrowband modes end of the band the Local oscillator frequency follows as 5330MHz. i.e. 430MHz will give 5760MHz. Assuming that I want to use a ADF4350 module as the main bit of the LO for the same reasons as I did previously for my 13cm Transverter (NERG News Nov. 2020) and that module tops out at some 4GHz, I need to run the ADF4350 at some sub-multiple of 5330MHz. The obvious candidates are 2665MHz (5330/2) or 1776.6667 (5330/3). Even though the 3rd harmonic might be a bit stronger, the second is a nicer round frequency which should lock more accurately to an external 10MHz reference. So, I will try for 2665MHz first.

General Module Design.

Filter Block Design.

The first, and one of the most important, modules or building block to design is the basic filter element, this will be used throughout the transverter, in the LO multiplier (tuned to 5330MHz), and in the TX and RX path at 5760MHz. These frequencies are far too high for standard LC lumped component filters to be practical, so some sort of transmission line design is required. One possibility used in a number of commercial designs is some sort of printed circuit board filter with the transmission line elements formed via microstrip. This is very convenient for the single board *designs as the filter is effectively built at the same time as the PCB. Classic designs use the transmission line segments in close proximity so that the coupling between them also becomes part of the filter. Several different shapes of transmission line are used, with one of the common ones (as it is very space efficient) being "U" shaped which are called hairpins. Unfortunately, the design and realization of these sorts of filters is difficult for the amateur for two reasons. Firstly, the design needs some pretty serious CAD software the cost of which is beyond the normal Ham. Secondly intrinsic in the design is the need for a very good understanding of the properties of the PCB material used, and preferably one which has lower losses at GHz frequencies, which again basically leads to higher expense.*

Another filter topology used, especially by Hams is the so called pipe cap filter. These sort of filters were first seen in some German Microwave designs, but were quickly copied by US and UK Hams. The basic layout of these filters is seen in Figure 3. A copper plumbers pipe end cap (looks like a small copper cup) is soldered to a PCB. A bolt with a lock nut enters the top of the pipe cap through a treaded hole and is screwed in such that a specific length of bolt protrudes into the cap inside. Coupling into and out of the filter is done using bits of wire going up through the PCB.

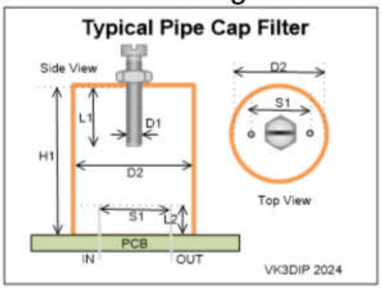

Figure 3- Pipe Cap Filter

While this design can be very convenient for the Ham, it has a number of problems. First of which is that there is very little design information available. Virtually all existing designs have been created using large amounts of "experimentation" and assuming you can find a design that suits your frequency etc. needs, the only real alternative is to copy that design down to the last detail. Apart from, and or arising from this there are a number of problems making this option difficult for VK Hams.

These include:

- *Our commonly available plumbing fittings are all metric, and particularly US hams still document designs in common US sizes which are all imperial.*
- *With copper prices going through the roof, and with the increasing use of plastic pipe and fittings, it can be very difficult to obtain the equivalent end caps to those used by US Hams.*
- *Even if you get the right end caps, US bands and band plans in many cases are different from VK ones, meaning a certain amount of experimentation will be necessary anyway.*
- *Even after several people have theoretically analysed this sort of filter, with the consensus that the protruding bolt segment forms a quarter wave resonant transmission line segment with the pipe cap body, and the coupling probes are coupling to the electric field, the design and tuning of this sort of filter is often found to be a nightmare. In particular because the length of the bolt (L1) will vary both the filter frequency and the coupling at the same time.*
- *Unless great care is taken with the screw materials, and the thread in the pipe cap it goes through, especially as the thread is at the low impedance end, any losses will degrade the filter Q and or make it vary over time.*
- *Due to many of these points, Ham pipe cap filters often end up being less than perfect.*

The design I ended up using looks a bit similar to the pipe cap but is actually the much older and more well understood "cavity" style filter. Cavity is in inverted commas because it is not a resonant *cavity as such, similar to the first pipe cap type it is actually a quarter wave resonant transmission line style filter. See Figure 4.*

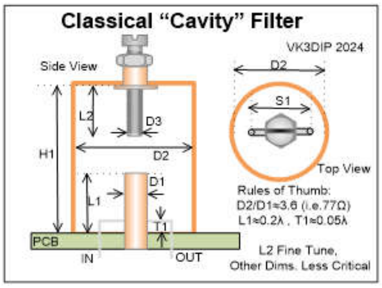

Figure 4 - "Cavity" Filter

This filter is in theory the same as the cavities found in repeaters etc. just much smaller because of the much higher frequency. Theory and construction info. for these has been around for a quite a while, for example see "Coaxial-Tank V.H.F Filters" by Edward Tilton W1HDQ in October 1964 QST. The difference here is that at 5.7GHz the dimensions are quite small and thus can easily fit on a PCB.

Filter Block Build.

I started with a visit to Bunnings and purchased what they call 20mm Copper Capillary End Caps. They were about $3.50 each. The inner diameter of these (D2 in Figure 4) turned out to be 19mm and the inner height (H1) was 15.6mm. Given the 19mm D2 that implied from the rules of thumb that I wanted a D1 of around 5.3mm for a 77 Ω transmission line. The 77 Ω, is the value of characteristic impedance that in air dielectric coax equates to minimum losses, which in this case will equate to maximum Q. In practice the literature lists characteristic impedances from about 50 to 100 Ω as being usable but Q will suffer. So then to find some 5.3mm outer diameter copper pipe. At 5760MHz , λ = 52.08mm (closer to 5cm than 6cm but it's still called 6cm?) and the 0.2λ works out to about 10.4mm so I don't need that much. The best source I found was on Aliexpress where a number of crowds were selling short (nominally 12mm) lengths of copper tube intended for crimping wires together. I bought a packet of 100 pieces of the one with a nominal 5.5mm outer diameter (approx. $3.50AUD) which was the closest they had to 5.3mm. I checked these values in AppCAD and they gave a Zo value of 74.3Ω which I felt was close enough to 77Ω.

Next step was to do a PCB for the filter. Yes, this was a case of just draw it being the most convenient so I used Sprint Layout (rather than KiCAD) along with AppCAD to do the line calculations. I ended up doing one board which contained two filters and two amplifiers (more on these later) See Figure 5 and Figure 6. The filter PCB has a plated through hole of 5.5mm diameter for the inner, and a tinned ring on the base for the pipe cap with lots of vias. When the boards came I cut a few of these up into individual filters and amplifiers to make up for test.

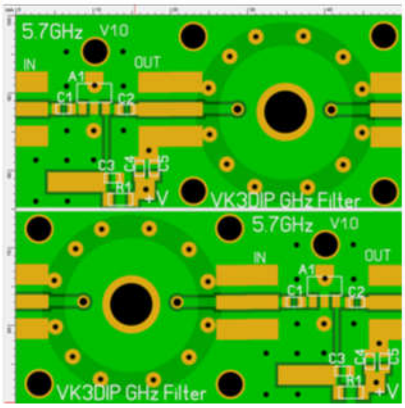

Figure 5 - PCB Top

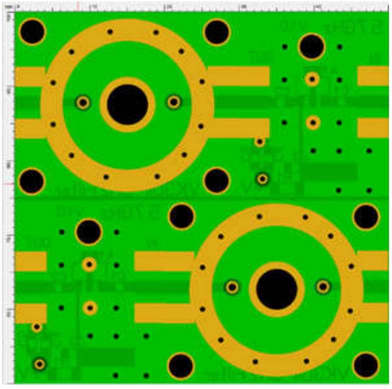

Figure 6 - PCB Bottom

*From the previous calculation we had the length of 5.5mm tube required to protrude above the board to be 10.4 mm. The tap height works out to be 0.05*52.08=2.6mm, as you can see in Figure 7 I won't guarantee the 2.6mm as getting a ruler in was difficult, but it is fairly close. It should be understood that the tap position effectively sets the filter (loaded) Q, a higher tap point will lower the Q, and to an extent a lower tap will increase the Q. The maximum value of the Q will be the unloaded Q which is pretty good because of the copper and air dielectric, but could be increased by silver plating or equivalent. The value in the rule of thumb for the tap is a reasonable compromise for the materials used. I used just a section of solid hookup wire for the links, but again I could have used silver plated but its probably not going to make much difference without silver plating the rest also.*

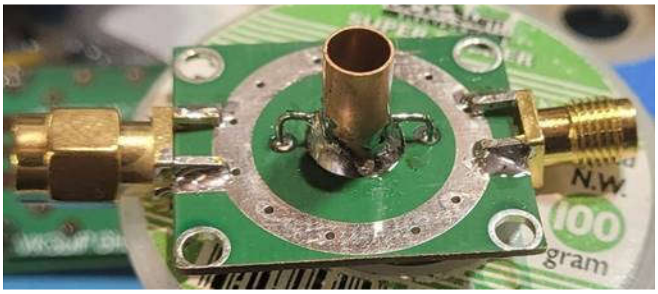

Figure 7 - Filter no cover- Filter top(PCB Bottom)

For future versions of the filter I will measure the height of the centre tube before soldering it in, and drill a couple of small holes for the tap wire at the 2.6mm point. For reference my copper connector tubes were 11.8mm rather than 12mm so it pays to check, and my PCB was 1mm thick. Doing measurements before everything is made hot should make it easier to put together the subsequent filters. The picture in Figure 8 of the base of the filter shows how the centre rod protrudes about 0.5mm through the other side of the board 11.8 – 1.0 – 0.5 =10.3mm ≈10.4mm. Its better to be slightly short (i.e. set at a higher frequency) rather than slightly long (i.e. set at a lower frequency) as the tuning screw can only ever add end capacitance and lower frequency not raise it.

Figure 8 - Filter Base

Figure 9 - Filter with Cap on.

I drilled a 6mm hole in the centre of the pipe cap and soldered in a M4 brass threaded insert. I used M4 because that is what I found first. These inserts are intended to be melted into plastics etc. and I bought 20 of them from Aliexpress for about $3.90 they were called M4x5.6xOD6.3 20pcs Brass Hot Melt Insert Knurled Flange. Yes, I used a small butane torch to heat the pipe cap and coated both cap and insert with flux first. The idea behind the use of these inserts is that it gives both more threads and more robust threads for the adjustment screw to use. If you just thread the copper pipe cap top you would be lucky to get one complete thread, and it would be into soft copper, so it would not last. People have tried to solder on a standard nut to use as the thread but this is just too hard to do, and the insert basically self-centres, and the flange provides a really good solder join. The completed trial filter as shown in Figure 9. Note, in my case I used a copper M4 screw and lock nut to suit the threaded insert, and again the M4 is not particularly critical, the screw is only being a trimmer capacitor at the high impedance end. A thinner screw will just work out to lower capacitance and require a longer screw for setting the same frequency. Also note, the height of the cap doesn't matter much so long as it clears the end of the inner tube by at least a couple of mm's, in my case it cleared it by some 5mm's. Yes, once again soldering the cap to the PCB necessitated the use of the mini butane torch and flux. Be careful to only directly heat the copper cap rather than the PCB, a naked flame on the PCB will not end well.

Filter Block Test.

I was really pleased with the test filter when I placed it on the analyser (having calibrated it first of course to the SMA connectors). With no screw the filter centre was at 5860MHz, and it easily tuned down to the two required frequencies of 5760MHz for the RX/TX and 5330MHz for the LO. It would actually tune much lower but that required the tuning screw to be screwed in far enough to enter the centre 5.5mm pipe a la one of the old Philips Beehive capacitors. At this point the rapidly increasing capacitance both makes setting an exact frequency fiddly, and decreases the filter Q.

The filter response when tuned for the TX/RX frequency of 5.76GHz is shown in Figure 10.

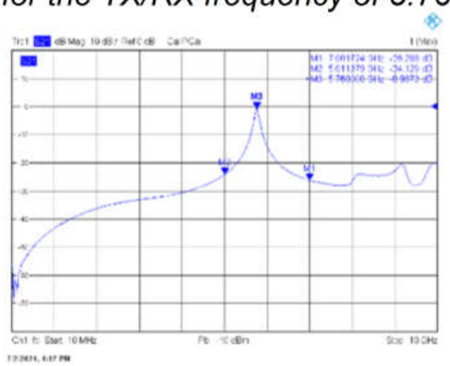

Figure 10 - Filter set for TX/RX

As can be seen a nice filter shape is obtained with reasonably steep sides. The centre frequency loss is just under 1dB, and the rejection of what would be the LO and image is quite reasonable. Tuning the filter by screwing in the adjusting screw a few turns gives the filter tuned for the LO frequency of 5.330GHz as is shown in Figure 11, the centre frequency loss has increased to about

1.7dB but the loss/rejection of the pre-doubled LO of 2.665GHz is over 30dB. This should be fine for the LO doubler.

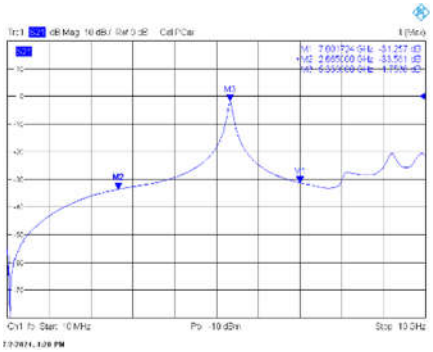

Figure 11 - Filter Set for LO

Amplifier Block Design.

The obvious candidate for the amplifier block is a MMIC the most used arrangement for which is shown in Figure 12. The value for Cb is chosen to be a low impedance over the frequency range of interest. Rb sets the MMIC current, and the RFC (typically an inductor) has a low DC resistance to pass the DC supply current, yet has a much higher impedance over the range of frequencies of interest, so as to not shunt the 50Ω output impedance.

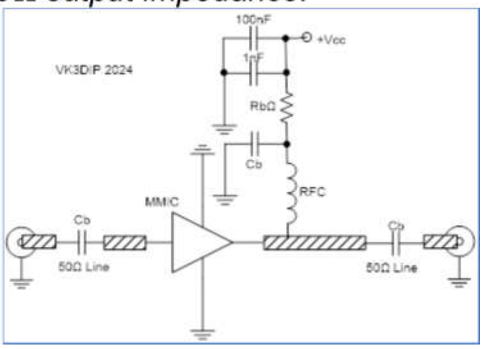

Figure 12 - Common MMIC setup.

This is not the setup I have chosen here. The problem, apart from getting a reasonably priced MMIC that will handle 5.7GHz and still have good gain, is that you are well and truly up in microwave territory where even small bits of the PCB can make big differences. The usual sort of rule of thumb for when trace length matters is when the traces are longer than say 1/15th or 1/20th of a wavelength in the board medium. We had the wavelength of 5.67GHz in air previously being some 52mm but in the typical/common (FR4) it will be somewhat shorter. AppCAD gives us a value more like 30mm for the wavelength which varies somewhat with widths of traces/board/copper etc. Taking the 1/20th just to make the maths easier that sort of says that any length of trace etc longer than about 1.5mm needs to be carefully considered, which is difficult if your average lumped component (even a surface mount inductor for the RFC) will be longer than this.

While there are special components made just for the RFC function that offer high impedances over a wide range of frequencies, (called Bias Tee's, that comprise many miniature inductors and exotic ferites) the ones that would do the frequency we need here are hard to obtain/expensive so we need a different approach. Luckily, we really only need a relatively narrow band of frequencies so I settled on the approach shown in Figure 13. This type of amplifier is used in some of the W1GHZ transverters.

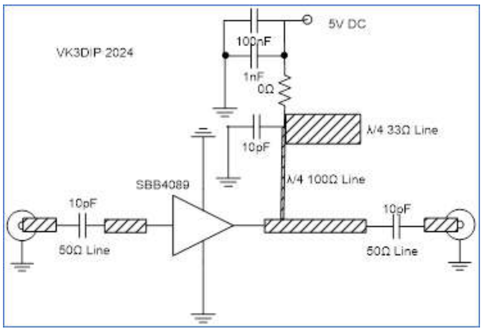

Figure 13 - Amplifier Design

Here I have picked the SBB4089z MMIC because it nominally covers the required frequencies, and because it is reasonably cheap on AliExpress at the moment (around $2 each in ten off). Other MMICS could also be suitable such as the ERA-1 or GVA-84 as used by W1GHZ but once again at the moment they are somewhat more expensive. In this design the lumped RFC component and to some extent one of the bypass capacitors are replaced by sections of transmission line. These lines rely on the properties of λ/4 transmission lines. In particular that, irrespective of characteristic impedance, λ/4 (allowing for velocity factor etc.) away from an open circuit looks like a short, and vice versa.

Starting with the thinner track at the 50Ω line end we want something that looks like an open circuit, so λ/4 away at the frequency of interest (5.76GHz) we want a (AC) short. We could (and do) achieve this short with a capacitor, but finding even a SM capacitor that behaves fully like a capacitor at 5.7GHz is difficult, so once again we trot out a λ/4 transmission line (the fatter one), which we setup to have a λ/4 away from the required short an open circuit. Why the specific line impedances though, as the impedance doesn't affect the impedance transform? This is intended to spread out the frequency over which the network works. In particular, below the λ/4 resonance the lines of a higher impedance (nominally thinner) will look like a series inductance, and the lower impedance (nominally fatter) lines will look like a capacitor to earth. So to some extent the two lines will tend to look like a standard LC low pass. If I had the expensive/posh PCB CAD software I could simulate this and optimise the line widths for maximum affect, but I don't so I again rely on old rules of thumb (in this case from the ARRL UHF/Microwave experimenters manual) and make the thin one around 100Ω and the fat one about 33Ω.

AppCAD once again happily calculates the widths and lengths needed and they are implemented via my "Just Draw It" PCB package Sprint Layout, giving the results shown in Figure 5. Note, I used Co-Planar Wave Guide (over ground) or CPWG rather than Microstrip traces because this nominally works better (though it can be more tricky to get right) at higher microwave frequencies.

The SBB4089z is a self/auto biasing MMIC so the Rb value is 0Ω.

Amplifier Block Build.

The completed test amplifier is shown in Figure 14. The input is a female PCB SMA, and the output a Male SMA.

Figure 14 - Amplifier Module.

Amplifier Block Test.

As before having calibrated the VNA (including a 20dB attenuator in port 2, in case it took off/oscillated tried to destroy the VNA etc.), the amplifier performance was measured over the range shown in Figure 15.

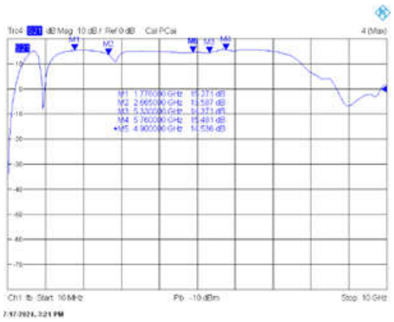

Figure 15 - Amplifier Response

As can be seen it produces a reasonably flat gain over the frequency range of interest (within a dB or so) so the rules of thumb worked reasonably well. There are some dips/resonances at lower frequencies (around 900MHz and 2.8GHz) but these shouldn't be an issue. If the 2.8GHz had have been at 2.66GHz it might have even helped to suppress the base output from the LO.

Amplifier and Filter Test.

The final thing to test is combining the Amplifier with the Filter. The results of these tests are shown in Figure 16, Figure 17, and Figure 18. We can see for example in the TX case the main signal at 5.76GHz will have 15.6dB gain (per AmpFilter pair) while the LO at 5.33GHz, and Image at 4.9GHz will experience -6.8dB and -13.275dB (i.e. a Loss). In the LO doubler case the 5.33GHz will have a 13.4dB gain and the base 2.66GHz will have a -17.5 dB (loss). Zooming in on the 5.76GHz case we see that the 3dB points (of a single AmpFilter pair) happily cover the band of interest. If I need to use multiple AmpFilter pairs in series I will probably have to stagger tune them, i.e. tune each filter to slightly different frequencies to spread things out.

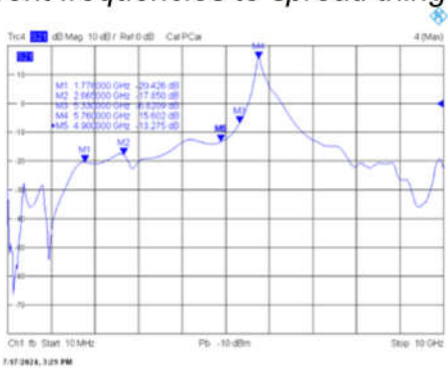

Figure 16 - Amplifier and Filter RX/TX

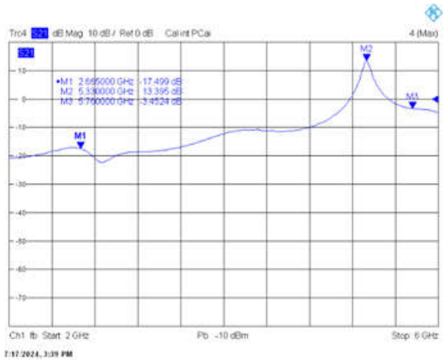

Figure 17 - Amplifier and Filter LO

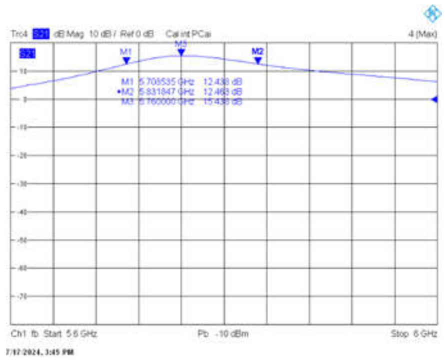

Figure 18 - Amplifier and Filter RX/TX 3dB points

Next Time.

The LO using the ADF4350 and the Doubler using the Amplifier and Filter.

73 Paul VK3DIP.

August 2024 PLANNED DXPEDITIONS

A few good ones are planned for the next month including Jarvis Is for the first time in many years. They will be using Superfox mode on FT8 so make sure you have the correct version of WSJTX!! The solar cycle is near its peakor so so get on the air and get you country count up. Remember the NERG is trying to improve on our 13th place in the world club ranking in the DX marathon, we need your score to help us.

Start	***End***	***Entity***	***Callsign***
Aug 03	Aug 09	Botswana	A25UX
Aug 03	Aug 13	Maldives	8Q7GG
Aug 03	Aug 20	Albania	ZA
Aug 04	Aug 12	Barbados	8P9MC
Aug 07	Aug 19	Palmyra Jarvis Is	N5J
Aug 10	Aug 17	St Lucia	J6
Aug 10	Aug 22	St Pierre & Miquelon	TO8FP
Aug 11	Aug 18	Aland Is	OG0C
Aug 13	Aug 20	Kyrgyzstan	EX
Aug 14	Aug 24	Turks & Caicos	VP5
Aug 15	Aug 29	American Samoa	KH8
Aug 15	Sep 15	French Polynesia	FO
Aug 17	Aug 30	Timor Leste	4W
Aug 20	Aug 27	Vanuatu	YJ0VK
Aug 23	Sep 30	Tristan da Cunha (6M Only)	ZD9GJ
Aug 26	Sep 04	Ghana	9G5AS

Aug 26	Sep 05	St Paul I	CY9C
Aug 29	Sep 30	Georgia	4L
Aug 31	Sep 03	St Pierre & Miquelon	FP
Sep 01	Sep 08	South Cook Is	E51WLG
Sep 02	Sep 16	American Samoa	KH8T
Sep 03	Sep 13	Zimbabwe	Z22AO
Sep 05	Sep 09	Monaco	3A
Sep 05	Sep 15	Pitcairn	VP6WR
Sep 09	Sep 30	Somalia	6O0T

Thanks to http://www.ng3k.com/misc/adxo.html

August 2024 CONTESTS

Note the dates of August 17th & 18th August and start your planning for the Remembrance Day Contest – The contest that a lot of people love and got them started in contesting. See https://www.wia.org.au/members/contests/rdcontest/ Use N1MM+ Logger and the UDC from Alan VK4SN's website.

Contest	*Times & Dates*
WAE DX Contest, CW	0000Z, Aug 10 to 2359Z, Aug 11
YB Bekasi Merdeka Contest	1200Z, Aug 10 to 1159Z, Aug 11
Maryland-DC QSO Party	1400Z, Aug 10 to 0400Z, Aug 11
SARL HF Digital Contest	1300Z-1600Z, Aug 11
SARTG WW RTTY Contest	0000Z-0800Z, Aug 17 and 600Z-2400Z, Aug 17 and 0800Z-1600Z, Aug 28
WIA Remembrance Day Contest	**0300Z, Aug 17 to 0300Z, Aug 18**
Russian District Award Contest	0800Z, Aug 17 to 0800Z, Aug 18
Keyman's Club of Japan Contest	1200Z, Aug 17 to 1200Z, Aug 18
CVA DX Contest, CW	1800Z, Aug 17 to 2100Z, Aug 18
SCRY/RTTYOps WW RTTY Contest	2200Z, Aug 23 to 1200Z, Aug 24 and 1200Z-2359Z, Aug 25
ALARA Contest	0600Z Aug 24 to 0559Z, Aug 25
YO DX HF Contest	1200Z, Aug 24 to 1200Z, Aug 25
Kansas QSO Party	1400Z, Aug 24 to 0200Z, Aug 25 and 1400Z-2000Z, Aug 25
Ohio QSO Party	1600Z, Aug 24 to 0400Z, Aug 25
CVA DX Contest, SSB	1800Z, Aug 24 to 2100Z, Aug 25
SARL HF CW Contest	1400Z-1700Z, Aug 25
UK/EI DX Contest, SSB	1200Z, Aug 31 to 1200Z, Sep 1
Russian WW MultiMode Contest	1200Z, Aug 31 to 1159Z, Sep 1
Colorado QSO Party	1300Z, Aug 31 to 0400Z, Sep 1
September 2024	
Tennessee QSO Party	1700Z, Sep 1 to 0300Z, Sep 2
Russian RTTY WW Contest	0000Z-2359Z, Sep 7
All Asian DX Contest, Phone	0000Z, Sep 7 to 2400Z, Sep 8
Ohio State Parks on the Air	1400Z-2200Z, Sep 7
CWOps CW Open	2000Z-2359Z, Sep 7

Many thanks to http://www.contestcalendar.com/contestcal.html

Discounts from Suppliers

Club members can get discounts from two suppliers:

***Altronics. (Australia Wide)**, Mention you are from the North East Radio Group or give our customer no - 64429. Discount will be minus 10% up to 45% off depending on the item. (Actual discounts depend on the product type and quantity purchased). There is No Minimum Spend in store to receive the discount. For on-line or phone Sales there **IS** a Minimum spend of $25.00 inc GST but **NOT** including Freight. In the comments section put "64429" to receive the discount.*

We have discovered that David VK3UQ gets an email, that you may not get, detailing delivery of your order. So pop him an email when you order *and he will be able to track which email belongs to you. We hope to have a method of dealing with this soon. President at nerg.asn.au*

Jaycar Electronics stores *by mentioning you are from the "NERG" no spaces quotes or dots etc, Account code is 44700493. You need to spend a min $25.00 to receive a 10% discount. http://www.jaycar.com.au/*

VK3CNE REMOTE STATION

Can be used for receive on all HF bands. Provides transmit on 160 metres using a dipole, 80 and 40 metres using a trapped dipole and a Spiderbeam for 20 through 10 metres.

This is available to members, you will need:

- *An Amateur Radio Licence – any grade.*
- *A windows computer with sound card connected to a speaker and a microphone. A PC headset is ideal.*
- *OR an android tablet or phone and are prepared to pay for the app (less than $20)*
- *Download the client from RemoteHams.com install it on your machine and register with RemoteHams.com using your* ***callsign****. The android app is called RCForb and is available on google play.*
- *The NERG station is "VK3CNE" Connect to it and request "club" membership and TX capability. Then wait until your membership is approved and away you go!*
- *Usage privileges are only available to financial NERG members with VK callsigns.*

VHF / UHF Remote

The VHF/UHF remote operates exactly the same as the HF version, the Station is "VK3CNE – 9700"

About the NERG

The NERG Inc. *Reg No A0006776V* http://nerg.asn.au *The North East Radio Group, Inc. is an amateur radio club devoted to encouraging members and others to enjoy the hobby of amateur radio. It tries not to hang on ceremony and endless reporting but rather participate in the fun aspects of this fascinating hobby.*

MEMBERSHIP FEES

Due in August: Full: $35 Family: $50 Remote Member: $50 Concession: $25 You will get a renewal notice please wait for this before you pay.

COMMITTEE

President	*David VK3UQ*
Vice President	*Greg VK3VT*
Secretary	*Anthony VK3YH/BNR*
Treasurer	*Greg VK3VT*

Committee Members

Mark VK3BYY	Ben VK3UW/SWK
Phil VK3RP/BOY	Chris VK3IK/AWG
Peter VK3PCC	Ed VK3BG

NERG NEWS ARTICLES

The NERG is always happy to receive news, articles, and member's wanted or for sale advertisements for inclusion in the newsletter. Please contact the editor at news{at}nerg.asn.au

NETS

NERG *NETS run on the club's 70cm repeater VK3RMH TX 438.325MHz and RX 433.325MHz both C4FM and analogue.* ***That means you RX on 438.325MHz and TX on 433.325MHz.*** *You will need a 91.5Hz CTCSS tone on your analogue FM TX and if you don't want to be bothered with listening to the C4FM digital signals on the output then set your radio to 91.5Hz CTCSS tone on RX as well.*

(8.30 – 9.30 pm Non-meeting Thursdays). Feel free to join the discussions.

146.575MHz is used as a general Net frequency by a number of NERG Members and is often used by the DX chasers in the club while hunting DX. Foxhunters use this channel for liaison as well on the third Friday of the month.

Club Sponsor

Margherita Pizza ph 9434 4980

89 Main Road, Lower Plenty, Vic 3093

web www.margherita.com.au

Margherita's Still Sponsor the NERG and provide the excellent suppers that we have come to enjoy. Order your next Pizza dinner from them and tell them you appreciate their support of the club.

Facebook

The NERG is on Facebook – A group has been established and can be found at

https://www.facebook.com/groups/nergamateur/

Members are encouraged to join this group