



NERG NEWS

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Incorporated 1985 Victoria Reg No A0006776V
Affiliated with the WIA
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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.

May 2024

WHAT'S ON THIS MONTH?

Monthly meeting

Thursday 9th May - 8PM

The DX Marathon explained – from Mark WC3W via ZOOM – Find out what the DX Marathon is and how everyone can be involved not just the super stations. Mark is the director of the DX Marathon and this should be a really interesting discussion. Note: Mark will be on Zoom but we will be at the hall.

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 28th May 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 Assessment** **Day**

Saturday 25th May 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

Kit day starts around 10am lunch will be available.

May 2024 PLANNED DXPEDITIONS

Lots of DX around last month and a couple of beauties coming up including Gloriosa, a very rare entity and these will be lots of callers!!. Conditions are great so get in there and work some DX while conditions are good.

Start	End	Entity	Callsign
Apr 28	May 07	Conway Reef	3D2CCC
Apr 29	May 16	Bermuda	VP9
Apr 30	May 13	Botswana	A25SHD
May 02	May 17	Rwanda	9X2AW
May 02	May 12	Cambodia	XU7GNY
May 03	May 08	Barbados	8P9NO
May 10	May 17	St Kitts & Nevis	V4
May 11	May 19	Bolivia	CP7DX
May 14	May 26	Barbados	8P9CB
May 17	May 27	Cyprus SBA	MW0BRO
May 19	May 31	Maldives	8Q7KR
May 23	May 27	Bermuda	VP9
May 24	Jun19	Glorioso Is	FT4GL
May 22	Jun03	Br Virgin Is	VP2V
May 22	Jun05	Ogasawara	JD1BQW
May 30	Jun10	Pitcairn	VP6DF
May 30	Jun20	Crete	SV9
Jun01	Jun15	Mozambique	C91AHV

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

May 2024 CONTESTS

The big CW contest for the year is on this month with the CQ WPX CW on the 25th & 26th. There are several more CW contests on too during the month. There are a few more US State QSO parties on if you are interested in chasing US states and counties. You can start preparing for the VK Shires Contest on the 8th June.

Contest	Times & Dates
CQ-M International	1200Z, May 11 to

DX Contest	1159Z, May 12
VOLTA WW RTTY Contest	1200Z, May 11 to 1200Z, May 12
Canadian Prairies QSO Party	1700Z, May 11 to 0300Z, May 12
UN DX Contest	0600Z-2100Z, May 18
NZART Sangster Shield Contest	0800Z-1100Z, May 18 and 0800Z-1100Z, May 19
EU PSK DX Contest	1200Z, May 18 to 1200Z, May 19
His Maj. King of Spain Contest, CW	1200Z, May 18 to 1200Z, May 19
Arkansas QSO Party	1400Z, May 18 to 0200Z, May 19
Baltic Contest	2100Z, May 18 to 0200Z, May 19
FISTS Sunday Sprint	0000Z-2359Z, May 19
CQ WW WPX Contest, CW	0000Z, May 25 to 2359Z, May 26
June 2024	
Kentucky QSO Party	1300Z, June 1 to 0100Z, Jun 2
UKSMG Summer Contest	1300Z, Jun 1 to 1300Z, Jun 2
RSGB National Field Day	1500Z, Jun 1 to 1500Z, Jun 2
IARU Region 1 Field Day, CW	1500Z, Jun 1 to 1459Z, Jun 2
ARRL Inter. Digital Contest	1800Z, Jun 1 to 2400Z, Jun 2
VK Shires Contest	0000Z-2359Z, Jun 8
Batavia DX Contest	0000Z, Jun 8 to 1700Z, Jun 9
Asia-Pacific Sprint, SSB	1100Z-1300Z, Jun 8
Portugal Day Contest	1200Z, Jun 8 to 1200Z, Jun 9
GACW WWSA CW DX Contest	1500Z, Jun 8 to 1500Z, Jun 9

Many thanks to

<http://www.contestcalendar.com/contestcal.html>

A Simple FT8x7 CAT Display

Part 3. Add a 7-way Relay IF Switch

By Paul McMahon VK3DIP

Why a Transverter IF switch.

In parts 1 and 2 of this series we have got ourselves a display that connects to a FT8x7 and which basically does the simple maths of adding some offset value to the frequency of the transceiver and displaying it. We also have a nice rotary switch to change which offset we want, but we still have to play around changing coax connections to Transverters etc. after changing offset. The idea of the IF switch is to have the same rotary knob also control a RF switch which will basically also connect the Transceiver (ie. IF) to the appropriate Transverter.

Mechanical switches can be made/bought that work at these frequencies (common IF's are 144 and 432 MHz) but they are rare/expensive. Electrical switches such as coaxial relays or PIN diode arrays are also available but suffer from a number of problems from an amateur perspective . Expensive and hard to find in the coaxial relay case, and relatively low power handling, higher through losses, at least for the readily available devices, in the PIN switch case.

For my version here I have gone with another option which is using a fairly common, low-cost relay not made for these frequencies and just seeing how well it goes.

A Few Tweaks First.

Before looking at the relay bits, I ended up making some changes to the display part of the device as shown in part 1 and 2. I have kept the first version of this display in the small jiffy box as is for a portable setup. However as this was powered via the FT8x7 acc socket (which at least in the FT817 case has limited current capacity), and as the relays etc. take up both space and power, I decided to build yet another version in a larger box for in the shack use. While rebuilding it was convenient to change the offset select setup slightly to basically free up a digital input on the Nano, which by the way I am planning to hopefully use for a future version that will have an optional mode for a IC705.

The revised (V2.2) total schematic for the display portion is shown in Figure 1 - Schematic Diagram. There are only a few changes from the original (V2.1). The most obvious is that the rotary switch now has six 1.8K Ω resistors rather than the previous five 2K Ω ones. The second pole of the through switch now is used to effectively provide a seventh position to the analogue input rather than to digitally indicate it to the Nano. As well as freeing up the port the, 1.8K Ω resistors are also somewhat easier to find. The only other difference is that the power is now direct from an external source rather than via the Transceiver.

As well as the hardware changes there are a few mirroring software changes which can be found here: http://www.yagiacad.com/Projects/VK3DIPCATDV2_2.zip .

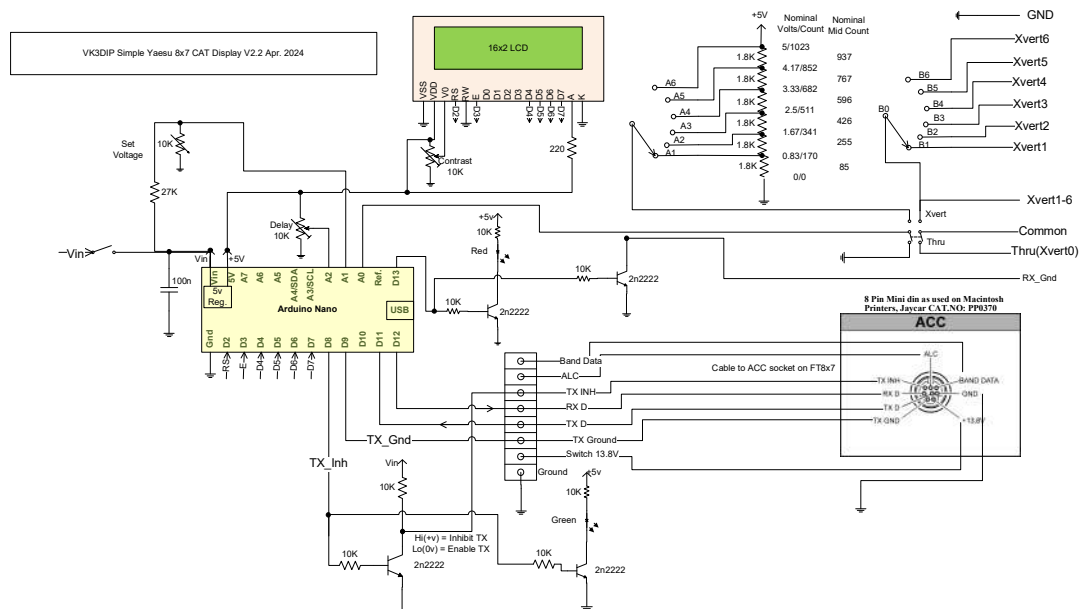


Figure 1 - Schematic Diagram

The Relays.

Before looking at what I ended up using it is worth while looking at relays in general with respect to RF. At the end of the day for RF it's all about the physical design/layout becoming more and more important as the frequency increases. At HF then practically any general-purpose relay will do a quite acceptable job, as we get into VHF and above it becomes increasingly necessary to have contact and moving parts conform to a low loss fixed impedance transmission line with a value of typically 50Ω. In essence, a coaxial relay is like a normal relay where the contacts, armatures, and surrounds have been set up with dimensions to form 50Ω transmission lines with respect to ground, the higher precision with which this is done, the better (and higher cost) the coax relay. Typically, coaxial relays are a SPDT type of setup i.e. a single change-over, where-as most common general-purpose relays are typically DPDT or a dual change-over. Coax relays are a specialist component and without fail come at a premium price, they also can suffer from burned out/corroded contacts (usually due to excessive power into poor loads), and other wear and tear, so second-hand (cheaper) ones need to be treated with some suspicion.

As mentioned above solid-state or PIN switches are available for RF, however the ones I could find as available on places like aliexpress either don't have enough ports or have some other "feature" (loss, power handling, or cost) making them not suitable for the task here. So, seeing as I basically wanted a specialist relay at a general-purpose price and availability, I am left with only the RF designers last resort, ie. if there are going to be discontinuities then make them as physically small/short as possible and hope you get away with it.

The relay I ended up choosing then is the OMRON G6K-2F-Y, these are a very small ("the world's smallest mounting area", according at least to the datasheet) general-purpose DPDT surface mount relay. They are reasonably easily available from AliExpress etc. in various coil voltages for less than AU 1\$ each in 5+ lots, and are characterised in the datasheet at frequencies up to 100MHz.

Because of the history of this project I ended up designing two relay boards and getting prototypes made. The first chronologically was the six way one, and the second was a two way one to make up the full 7 paths that I ended up needing.

2Way Switch.

The most successful of these two, at least in terms of performance, was the second ie. two way board, I obviously learned a few things from the six way one. The layout of the two-way board is

shown in Figure 2 - 2Way Switch. It is small 25mm by 25mm all surface-mount including the snubber capacitor and diode.

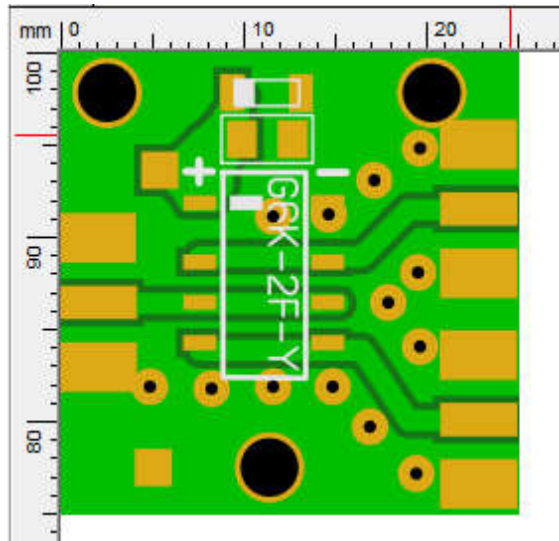


Figure 2 - 2Way Switch

An actual build of this board is shown in Figure 3 - Actual 2Way Board..



Figure 3 - Actual 2Way Board.

Things to note are, that while a DPDT I have paralleled the two poles so I am using it as a SPDT, this gives increased current handling (not that I need it here), and possibly decreases strays. I will try a version someday using just one pole but the connectors will be getting very cramped and lack of isolation would probably make it unworkable.

I was quite pleased with the performance of this switch which can be summarised in three graphs. Figure 4 - 2Way Switch Return Loss looking into Port 1., Figure 5 - Through Loss Input to Selected Port, and Figure 6 - Loss Input to Unselected Port..

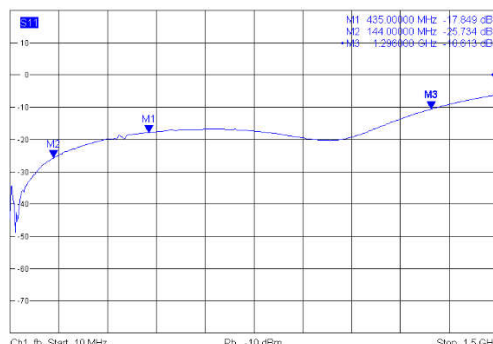


Figure 4 - 2Way Switch Return Loss looking into Port 1.

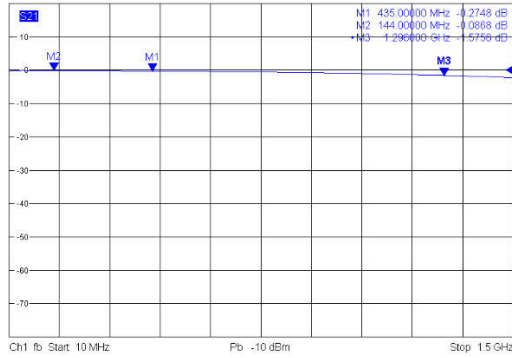


Figure 5 - Through Loss Input to Selected Port

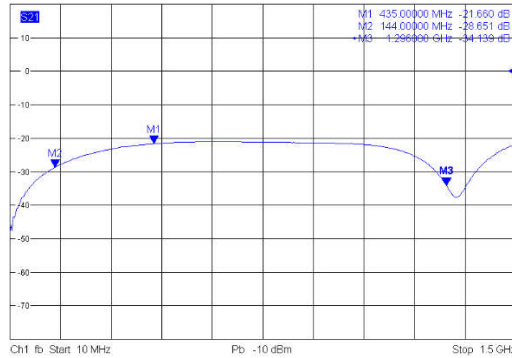


Figure 6 - Loss Input to Unselected Port.

Basically, as I am for this application only looking at 2m and 70cm IF's, very good input return loss (equiv. VSWR ~1.1:1 at 2M, ~1.3:1 at 70cm), low through loss (< 0.1dB at 2m, < 0.3dB at 70cm), and acceptable isolation (> 28dB at 2m, > 20dB at 70cm).

So, my choice of relay is at least in part validated. It is possible for this relay to be used at at least 2m and 70cm.

6Way Switch.

The 6 Way switch PCB is shown in Figure 7 - 6Way Switch PCB. It is a 50mm by 50mm board with the input in the centre and the 6 outputs around the sides.

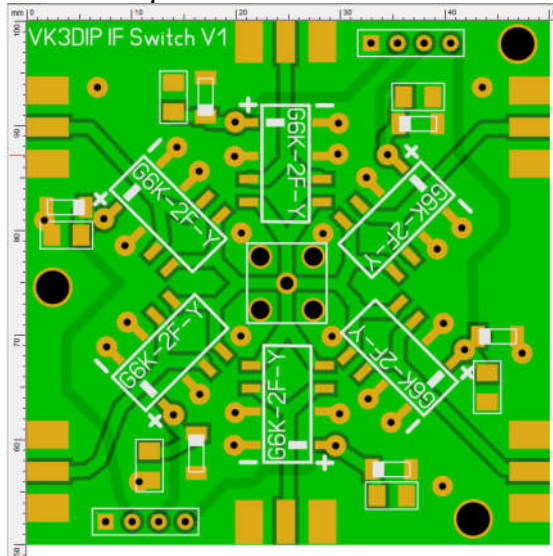


Figure 7 - 6Way Switch PCB

Unlike the 2Way board each relay only does one output with the non-selected relay contacts being grounded, the main intent of this was to increase port to port isolation. The fully stuffed board is shown in Figure 8 - 6Way Switch Actual.

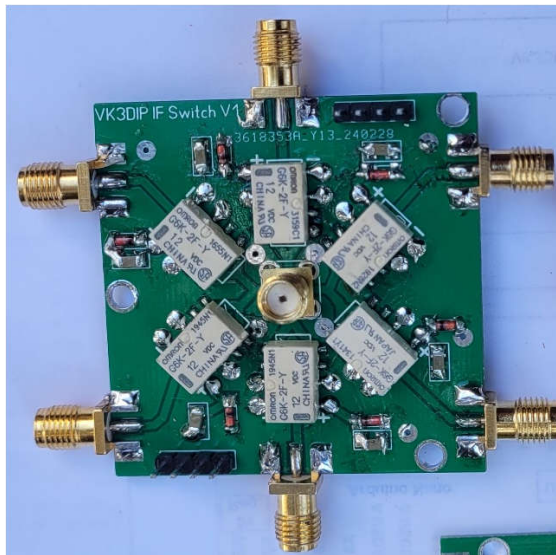


Figure 8 - 6Way Switch Actual

As hinted above despite high hopes the 6 Way board performance was less than I had hoped especially at 70cm. The performance can be seen in Figure 9 - 6Way Input VSWR, Figure 10 - 6Way Loss Input to On Port., and Figure 11 6Way Adjacent Port Isolation.

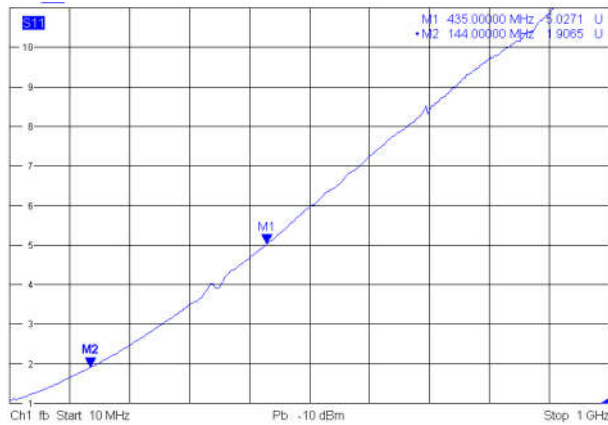


Figure 9 - 6Way Input VSWR

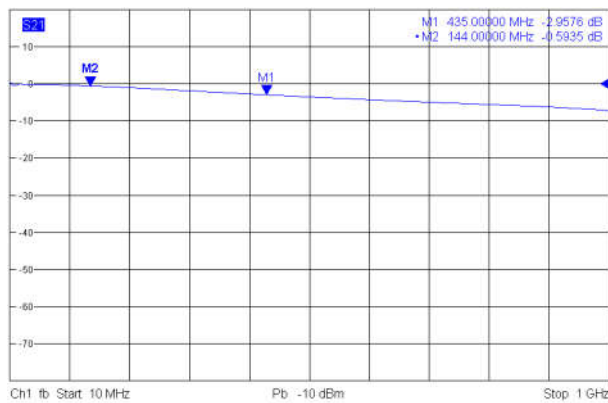


Figure 10 - 6Way Loss Input to On Port.

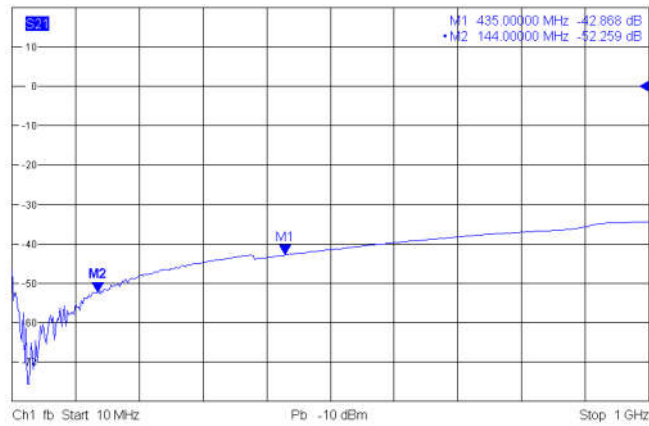


Figure 11 6Way Adjacent Port Isolation

The input VSWR of just under 2:1 at 2m is OK but getting up to 5:1 at 70cm is while probably usable for this particular Transverter IF far from perfect. Again while probably usable as a transverter IF 3dB loss at 70cm is higher than I would like. The adjacent port isolation is the only good figure in the lot with better than 40dB isolation.

While this is probably still workable in my case as said it is not perfect. All is not quite lost however as we know the base relay is capable of better, it is basically the effective strays of the open circuited lines to the other 5 off channels that is causing the issue. Some investigation with the VNA showed that this was equivalent to about 15pF to deck. So if you only say wanted a 70cm IF then you can cancel out this stray C with some added parallel L. Some quick calculations came up with a figure of some 8.6nH, I could have used a very small air wound coil, but the simplest was I happened to have a few 8nH coilcraft SM inductors and one of these soldered neatly on the back of the board between the input SMA inner and ground. See Figure 12 - 6Way Switch bottom with 8uH chip..

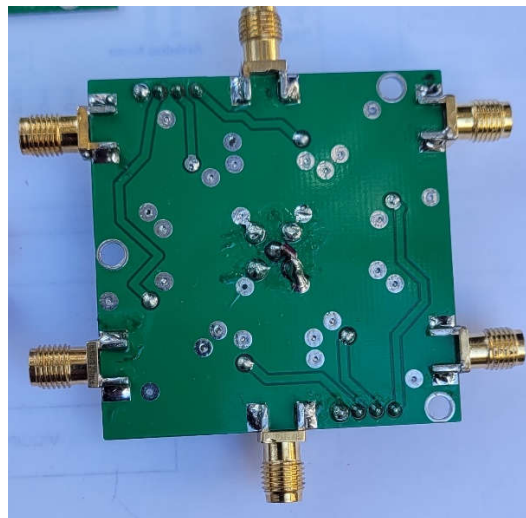


Figure 12 - 6Way Switch bottom with 8uH chip.

Its nice when things work out like this have a look at Figure 13 - 6Way Input with 8nH comp., and Figure 14 6Way with 8nH comp In to On Port Loss

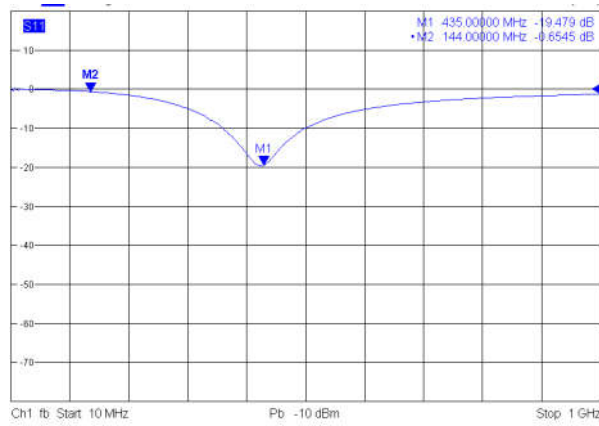


Figure 13 - 6Way Input with 8nH comp.

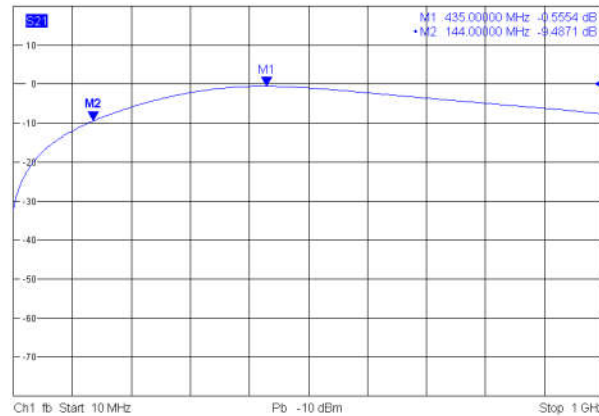


Figure 14 6Way with 8nH comp In to On Port Loss

With the added 8nH the input return loss at 70cm is actually equal or better than that of the 2Way and the insertion loss to the on port again at 70cm is down to around 0.5dB. It is of course much worse elsewhere but again if you only use a 70cm IF it is fine with one caveat, if you only have a 2m IF then the 6way is fine without any compensation, its only if you use a mix of both that you have a possible issue. The 70cm caveat with the compensated case is that the 8nH shunt of course is a DC short to deck and thus any DC transverter switching you may have been using will of course not get through the switch. In my case I will at least start off with the uncompensated version and see how we go in real world conditions.

Putting it Together.

In my case I used G6K-2F-Y -12V ie. nominal 12 coil voltage relays so the common connection to the second pole of the offset/thru switches was connected to the 12V supply in (via an on off switch). The schematic diagram of my current switching setup is shown in Figure 15 – Relay Switching .

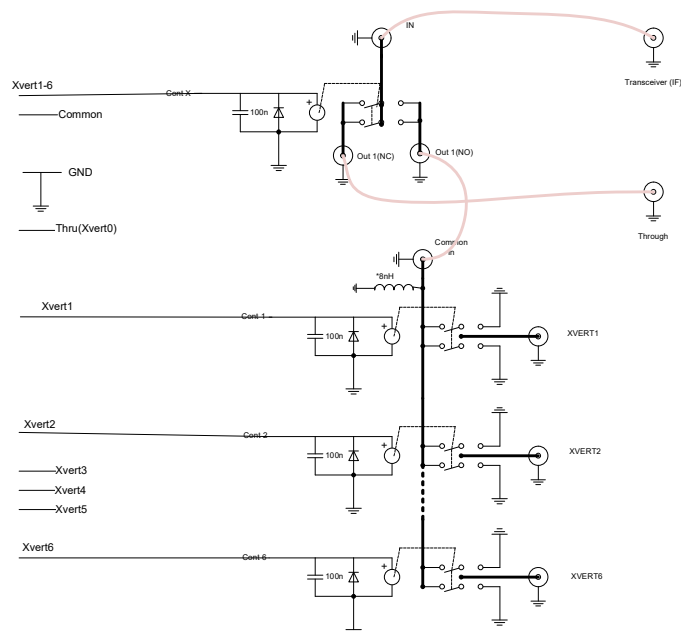


Figure 15 – Relay Switching

I use the 2Way switch activated via the Xvert1-6 line with the normally closed output port becoming the through port. I.e. the default no power connection will be through. If the toggle switch is in the Transverter position the 2W switch is activated and the connection goes to the input of the 6Way switch. The six DC inputs of the 6Way switch are connected to the Xvert1 to Xvert6 lines. So in effect as you rotate the knob you have the displayed frequency and the Transceiver connected to the appropriate Transverter. In my case I basically run special cables directly (the correct lengths and connectors) from the PCB switch in the case out through holes in the back of the box directly to the relevant transverter. You could use short patch cables between the switch boards and female connectors on the back of the box, but while that would be neater, that would need more room than I have on the box I have used for this version.

What's Next.

I have done quite a bit of the investigation for the Icom IC705 version and am pretty sure it will be possible (Bluetooth connection and all) depending how it goes it will possibly be along next time. The other alternative is I am also looking at building in a RX TX line separator to be able to differentially treat RX and TX eg. TX attenuation not RX, or even an RX only tap for a second receiver such as a SDR waterfall etc.

73 Paul VK3DIP

April round up

The monthly meeting was a presentation on the hows and whys of DXing from Chris VK3IK and Steve VK3KTT this was a really interesting evening and there was something there for everyone.

On Saturday 27th the kit day saw the team preparing a 6M antenna for the planned 6M remote station. Phil VK3BOY did his usual thing and saw another Foundation candidate

through the assessment process, congratulations to Peter VK3PGO.

There have been good attendances at Radio Café throughout the month with lots of interesting conversations and a bit of DX working by the club station.

Discounts from Suppliers

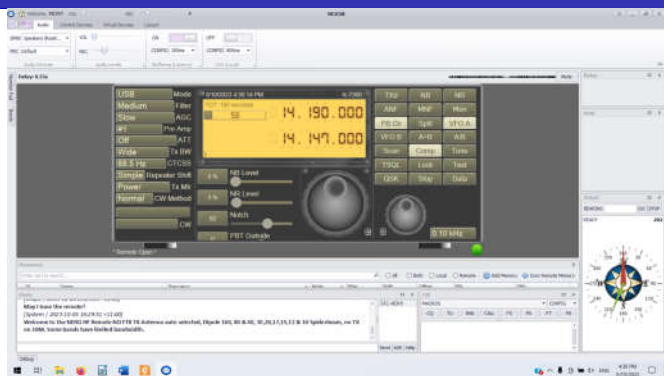
Club members can get discounts from two suppliers:

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@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