



NERG NEWS

North East Radio Group Inc
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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.

March 2024

WHAT'S ON THIS MONTH?

Monthly meeting

Thursday 14th March

Bouvet wrap-up – a report of the 3Y0J Bouvet DX pedition.

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 26th March 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 23rd March 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.

CLASS LICENCE update

Class licensing commenced on the 19th Feb 2024. This means a number of things:

1. The ACMA are now responsible for the preparation and control of examinations. They have established a pool of volunteer examiners similar to the previous AMC system.
2. There is no exam fee charged by the ACMA and examiners are not permitted to charge for administering exams (last bit was the same with the AMC exams).
3. Once a candidate has successfully qualified for a particular class of licence they can apply to the ACMA for a "Qualification Certificate" this costs \$43, you also apply to the ACMA for a callsign allocation and this costs \$32-\$53 depending on if it is next available call, selected 3 letter call or a 2 letter call.
4. There is no annual licence or callsign fee. Meaning that now it costs around \$90 to get on the air compared with the previous cost of around \$200 for the exams & first year and then \$52 a year after that.
5. As there is no longer an "Apparatus Licence" issued then you will not be able to look up callsigns on the ACMA Licence database and find the owner of a particular callsign. It will take some time for callsigns to drop off this database as Apparatus licences lapse. There is a new database of callsigns which shows which class of licensee they are allocated to, no details are shown.

March 2024 PLANNED DXPEDITIONS

Lots of DX around last month and a couple of beauties coming up. Conditions are great so get in there and work some DX while conditions are good.

Start	End	Entity	Callsign
Mar 01	Mar 31	Benin	TY5C
Mar 02	Mar 30	Sint Maarten	PJ7AA

Mar 03	Mar 22	Grenada	J38R
Mar 05	Mar 15	St Kitts & Nevis	V4
Mar 06	Mar 12	South Shetland Islands (AN-010)	XQ7UP/9
Mar 08	Mar 20	Tanzania	5H3VJG
Mar 10	Mar 19	New Caledonia	FK
Mar 11	Mar 27	Curacao	PJ2
Mar 12	Mar 27	East Kiribati	T32EU
Mar 16	Mar 21	Bahamas	C6A
Mar 20	Mar 29	Lesotho	7P8EI
Mar 25	Apr 08	Guadeloupe	TO1Q
Mar 26	Apr 01	Cyprus SBA	ZC4MK
Mar 26	Apr 02	Turks & Caicos	VQ5P
Mar 27	Apr 03	Austral Is	TX5XG
Mar 28	Apr 02	Mayotte	TO5LA
Mar 29	Mar 31	Mayotte	TO4VV
Mar 29	Apr 11	Vanuatu	YJ0VK
Apr 04	Apr 14	Pitcairn	VP6G
Apr 05	Apr 07	Mayotte	TO4VV
Apr 06	Apr 16	Liberia	A8OK
Apr 06	Apr 16	Maldives	8Q7HZ

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

March 2024 CONTESTS

If you are chasing DX this year then have a go at the RSGB Commonwealth contest. There are lots of rare Commonwealth countries on and they are looking for other Commonwealth countries like us!! The at the end of the month there is a huge phone contest – the CQWPX phone – great contest with lots of participation. N1MM+ Logger for both of these.

Contest	Times & Dates
ARRL Inter. DX Contest, SSB	0000Z, Mar 2 to 2400Z, Mar 3
Open Ukraine RTTY Championship	1800Z, Mar 2 to 1359Z, Mar 3
YB DX RTTY Contest	0000Z-2359Z, Mar 9
RSGB Commonwealth	1000Z, Mar 9 to 1000Z, Mar 10
South America 10	1200Z, Mar 9 to 1200Z,

Meter Contest	Mar 10
EA PSK63 Contest	1200Z, Mar 9 to 1200Z, Mar 10
Stew Perry Topband Challenge	1500Z, Mar 9 to 1500Z, Mar 10
Oklahoma QSO Party	1500Z, Mar 9 to 0200Z, Mar 10 and 1500Z-2100Z, Mar 10
TESLA Memorial HF CW Contest	1800Z, Mar 9 to 0559Z, Mar 10
Idaho QSO Party	1900Z, Mar 9 to 1900Z, Mar 10
BARTG HF RTTY Contest	0200Z, Mar 16 to 0159Z, Mar 18
Africa All Mode International DX Contest	1200Z, Mar 16 to 1200Z, Mar 17
F9AA Cup, SSB	1200Z, Mar 16 to 1200Z, Mar 17
Russian DX Contest	1200Z, Mar 16 to 1200Z, Mar 17
Virginia QSO Party	1400Z, Mar 16 to 0400Z, Mar 17 and 1200Z-2400Z, Mar 17
Maidenhead Mayhem Sprint	0000Z, Mar 23 to 2359Z, Mar 24
CQ WW WPX	0000Z, Mar 30 to

Contest, SSB	2359Z, Mar 31 April 2024
APRIL	
EA RTTY Contest	1200Z, Apr 6 to 1200Z, Apr 7
Missouri QSO Party	1400Z, Apr 6 to 0400Z, Apr 7 and 1400Z-2000Z, Apr 7
Florida State Parks on the Air	1400Z-2200Z, Apr 6 and 1400Z-2200Z, Apr 7
Mississippi QSO Party	1400Z, Apr 6 to 0200Z, Apr 7
Louisiana QSO Party	1400Z, Apr 6 to 0200Z, Apr 7
SP DX Contest	1500Z, Apr 6 to 1500Z, Apr 7

Many thanks to

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

A Simple FT8x7 CAT Display

By Paul McMahon VK3DIP

Why did I want one?.

Getting everything setup for the NERG show and tell last meeting for the 3.4GHz transverter was the final straw for using the FT897D as the IF for at least portable work. Don't get me wrong the FT897D makes a very good transverter IF, the built in transverter frequency display is fantastic, but not portable friendly, it draws way too much current to comfortably run on batteries and it is not particularly light. One of the most popular transverter IF rigs out there is the FT897D's smallest sibling the FT817D (and the newer FT818) it is low power by design, is also low weight, and it's small. What it does not have however is the transverter offset facility of its bigger brothers the 897 and 857, possibly because it also has a very small display so there really isn't the real-estate for it.

Of course, there are a number of aftermarket external displays available for the FT817 but they all suffer from the same three problems; i.e. They are expensive for what they are; I can't find any info on programming in transverter offsets for them; and finally, they are closed source so no way

to find out if they are using the so called “dangerous” undocumented CAT commands and or doing any customising.

So thus, is born the VK3DIP FT8x7 CAT display. No fancy graphical display, just a simple standard 16x2 character mode display with the basics of; Frequency, Mode, S/Power meter, and Supply Voltage which are the four things that I wanted to see when using it as a portable transverter IF. It's also not very expensive, the source is readily available (see later), it handles many different transverter offsets (5 + straight through in the prototype described here), it runs straight off the rig so no additional power supply needed, and finally it is much more readable than the built in FT817D display. Have a look at the prototype in Figure 1 - Completed Display, I think you can get the information you need much more easily.



Figure 1 - Completed Display

The Hardware.

This project is just about as simple an Arduino project can be and still be the sort of thing you might use every day, and so it makes an ideal introduction or first off project for Hams new to Arduino. Of course, you could just throw together the hardware and get the Nano programmed by someone else and you are off, but if you want to customise the transverter offsets someone is going to have to do a little bit of code editing.

As you can see from the schematic diagram in there really isn't all that much in it. An Arduino nano, a standard 16x2 LCD, a small handful of resistors (including two trimmers), plus a rotary switch.

The rotary switch is wired up as basically a 10K pot with 6 detent positions to select what offset we want. You could easily add more or remove positions if you wanted or needed it, but you would have to modify the code to suit.

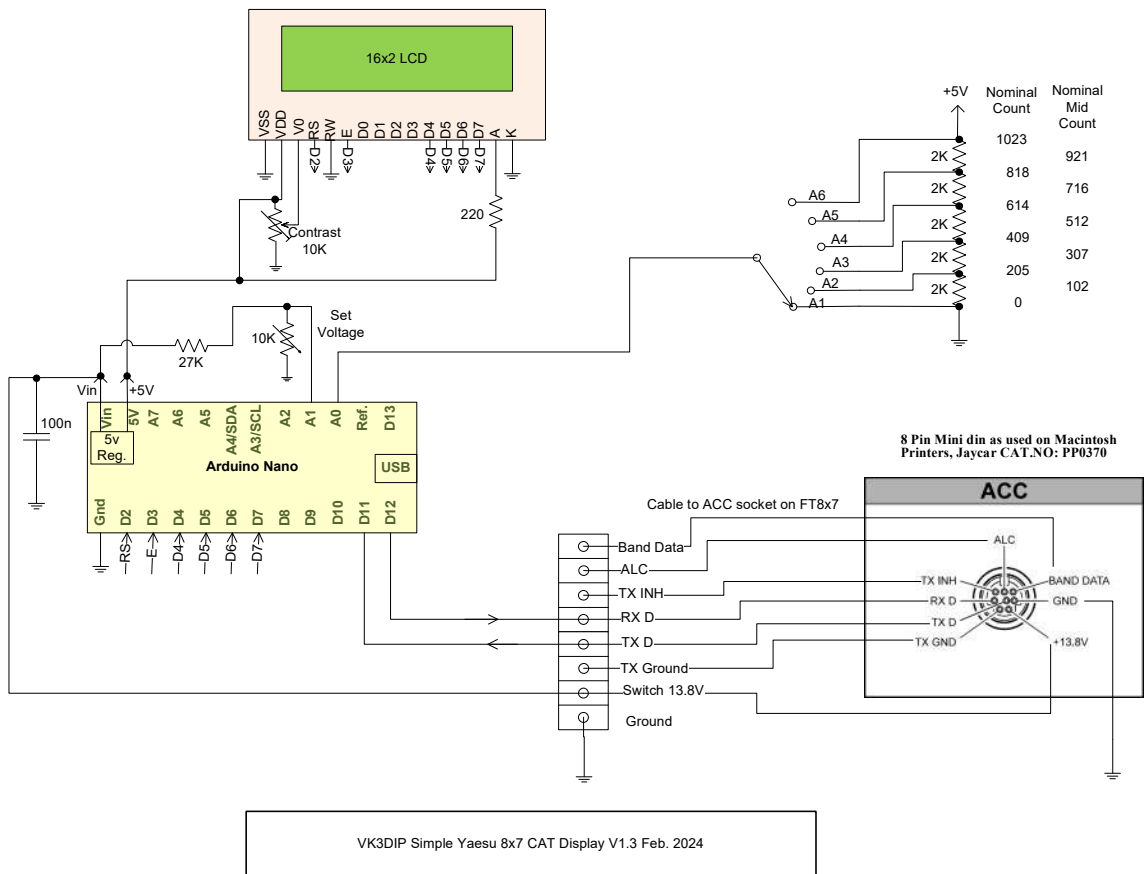


Figure 2 - Schematic Diagram

The circuit is so simple I chose to just implement it on one of my Nano proto boards rather than do a special PCB for it. The layout I used is shown in Figure 3 - Majority on Protoboard., with the actual version not looking quite so neat in Figure 4 - Real Life.

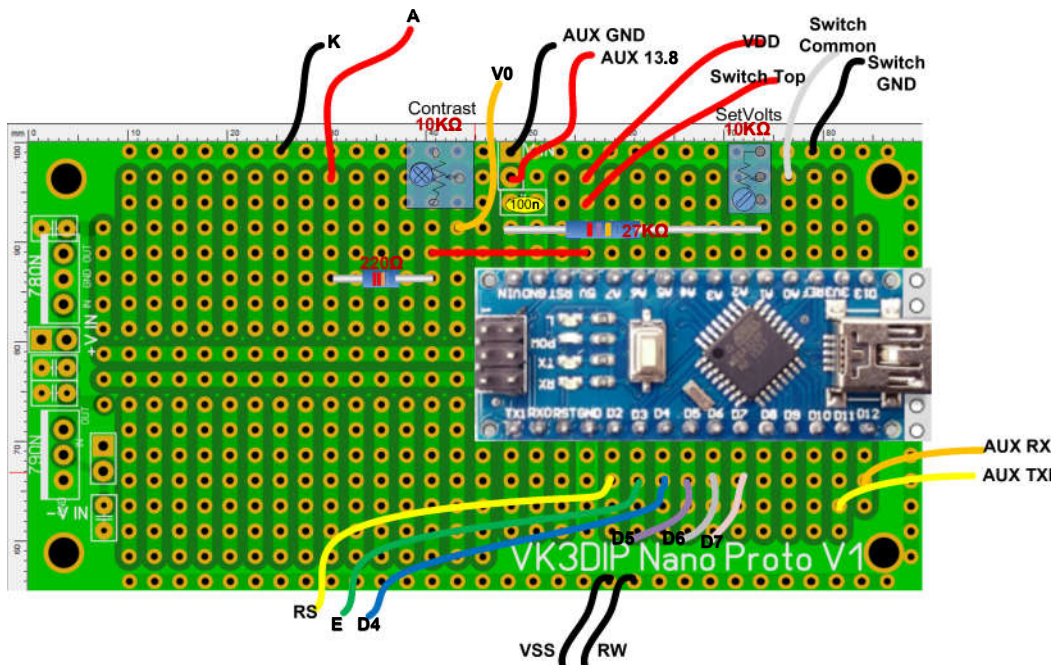


Figure 3 - Majority on Protoboard.

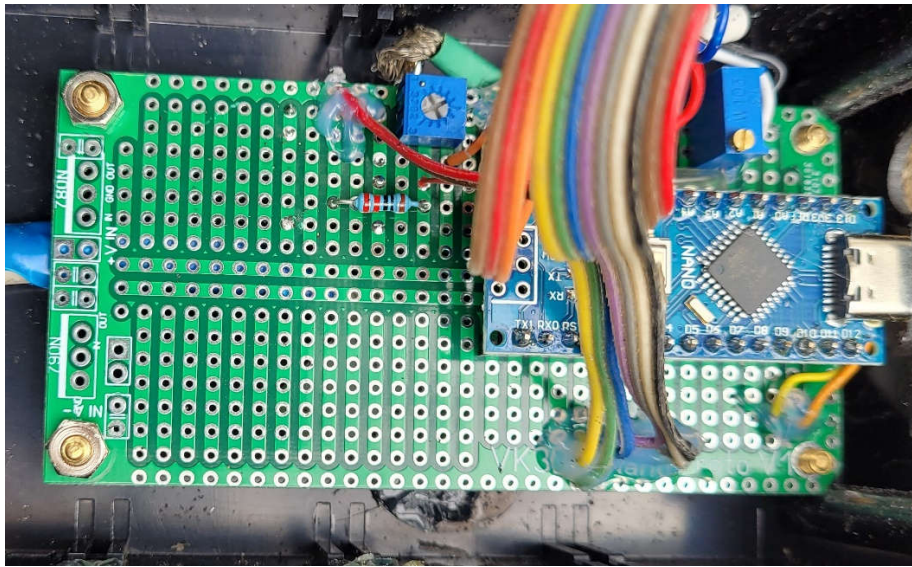


Figure 4 - Real Life

The rear of the front panel is shown in Figure 5 - Display and Selector Switch. (Which by the way I just noticed is upside down.) You can see I just mounted the 5 by 2K resistors directly on the switch and used hot melt glue to secure the display. I had the hardware basically built with a couple of hours of work. The whole thing is mounted in a UB3 Jiffy Box eg. Jaycar HB6013.

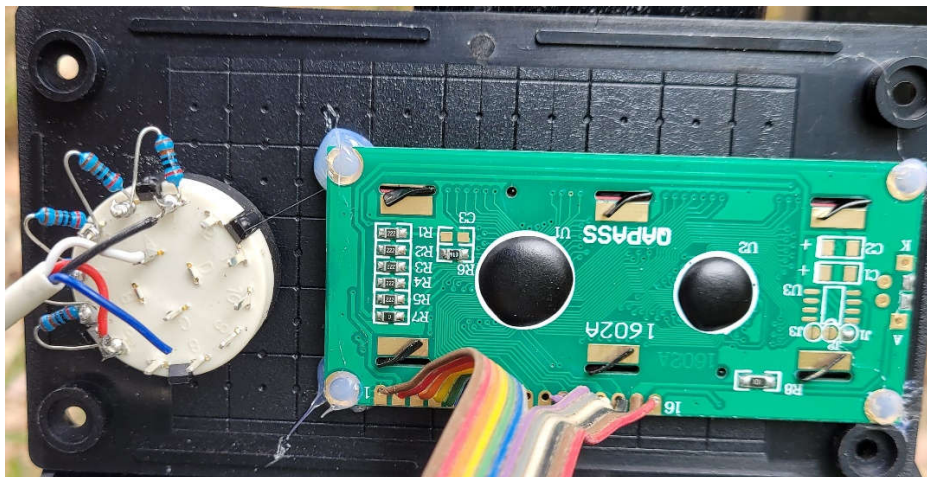


Figure 5 - Display and Selector Switch

The Software.

The software took a bit longer to get right than the hardware. I initially tried using a commonly available FT857 Arduino library but found that it was both too complicated for what I needed yet still didn't do some of the things I wanted. So, I ended up doing it all from scratch only using the just about built in very standard LCD and Software Serial library.

Basically, the software sets up the LCD and then waits for 10 seconds to hopefully allow the radio to start up before bombarding it with CAT commands. The forever loop then just retrieves the four pieces of information from the radio via a series of CAT commands. The four pieces of information are:

1. The Frequency :- 8 digits from radio to which are added the relevant offset as selected by the offset switch, displayed in decimal format top left .
2. The Mode:- mode byte from radio decoded and displayed top right as the char abbreviation.
3. The S or Power Meter:- 4bit level from radio (0-15) turned into bar graph plus S or P level displayed lower left.

4. *The Supply Voltage:- Scaled Analogue read via ADC converted to volts with one decimal place and displayed lower right.*

A typical display is represented in Figure 6 - Laying Out The Display.

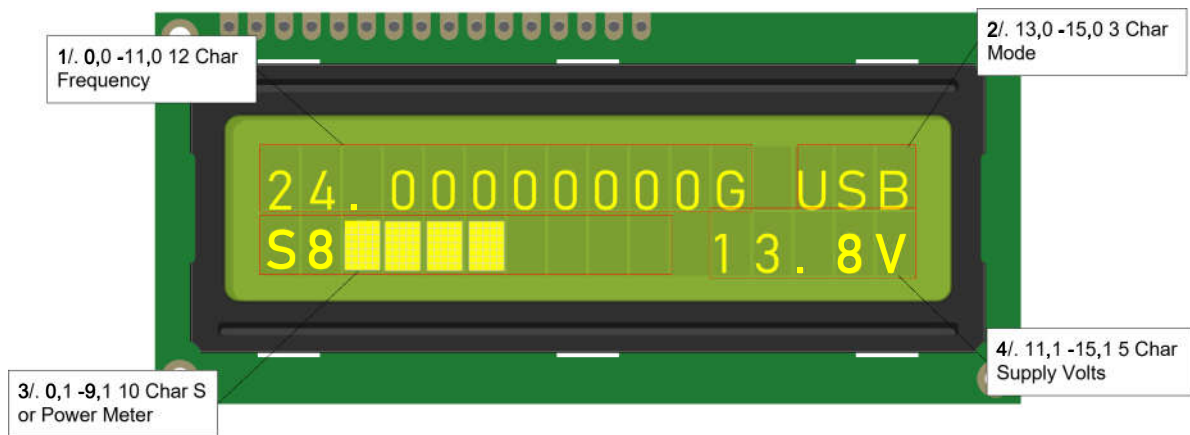


Figure 6 - Laying Out The Display

The current version (1.3) of my Arduino INO file (i.e. the source) I used can be downloaded from here: http://www.yagicad.com/Projects/VK3DIPCATDV1_3.zip I have used lots of comments so hopefully what is going on is self-explanatory. Just in case and especially for people who may want to do some customising I will highlight a few of the bits where you may want to make changes.

Just a note also I have tended to use portable data types like uint8_t rather than perhaps more common Arduino data types (byte in this case), this just makes the code a little more portable (ie. to other platforms) plus I don't have to keep looking up how big a word etc. is in Arduino. and doesn't really make any difference in the Arduino compile environment.

One of the things that needs to be understood is how I stored the frequency. The Yaesu CAT commands and responses pass frequency as a pseudo-8-character BCD value with the most significant nibble (top 4 bits of the first 8-bit byte) representing the 100MHz digit and the least significant nibble (bottom 4 bits in the fourth 8-bit byte) being 10Hz. I.e. in the Yaesu CAT protocol you cannot indicate any frequency with resolution lower than 10 Hz, or higher in value than 999.99999MHz. This is upper limit is not good for microwave transverters, so I store and use the frequency as an unsigned (i.e. there is no negative values) 32-bit word a uint32_t or in more common Arduino talk an unsigned long.

In my case the minimum value of a uint32_t (i.e. 1) corresponds to 10Hz because the radio can't handle any more resolution than that, and the maximum value of 4294967295 corresponds to about 42.95 GHz so the CAT display as is can handle transverters ie. display frequencies in the 23cm (1296MHz), 13cm (2.4GHz), 9cm (3.4GHz), 6cm(5.4GHz), 3cm(10GHz), and 12mm(24GHz) bands. In my case I used a 6-position switch and only included offset frequencies for straight through, 13cm,9cm,6cm,3cm and 12mm transverters all using either 2m or 70cm IF as I have or plan to use. If you want to add or change any of these then you must edit the values in the offset array. The appropriate code lines are given below. The relative frequencies are as explained above are listed to 10Hz resolution and are in the curly braces of the variable definition in the order that they are used in the array, i.e. the first item 0UL is offset 0 of 0 value (through), the second item (offset 1) is 225600000UL (2256MHz) and so on. The UL at the end of the number is necessary don't forget it, it tells the compiler that this is a number intended for an unsigned 32-bit word (UL = Unsigned Long).

```
// Offset Frequencies in DeciHertz (ie. 1 = 10Hz, max in 32 bits approx 4G  
dHz or real approx 40GHz ) ( actual max is 4294967295x10Hz which will  
equate to approx 42.949 GHz)
```

```
uint32_t Offset[] = {0UL, 225600000UL, 296800000UL, 533000000UL,
993800000UL, 2361800000UL}; //Array holding possible additive offset
values
```

The other code you may want to change if you want more or less bands is in the GetOffset subroutine. This routine reads the analogue voltage on pin A0 connected to the in my case 6-way resistive divider switch. Think of it as a 10K pot with detents. By the way I did it this way to both save some digital pins and to provide for where I want to ultimately go with the other half of the switch, see later. The code for GetOffset is below, basically I read the analogue value, which for 0 to 5V in returns a value of 0 to 1023 i.e. it is a 10bit ADC. I compare the count received to a value chosen as corresponding to a point midway between the actual values received for each switch position and return the appropriate offset number which is an index into the offset array mentioned above. See also the notes on the schematic. If you were to add or subtract switch positions, then you should use different resistor values such that they add up to close to 10K which is sort of an optimal point for the atmega328 ADC's. The mid points would be recalculated and the appropriate if's added/deleted.

```
uint8_t GetOffset()
{
  uint16_t A0in = analogRead(0); // read the value
  if (A0in < 102) return 0;
  if (A0in < 307) return 1;
  if (A0in < 512) return 2;
  if (A0in < 716) return 3;
  if (A0in < 921) return 4;
  return 5;
}
```

One other bit of code that may require some explanation is the code handling the other analogue read of port A1 for the supply voltage. As mentioned above the analogue ports basically measure from 0volts to 5volts or strictly speaking the value of the onboard 5v reference which may not be quite exactly 5v. Anyway, as the supply is greater than 5v the actual voltage needs to be scaled down to 5v. In the case here I chose an approximate division by 4 so if the supply was 0- 20v then the output of the resistive divider would be 0-5v. Again, as mentioned above the 0 – 5v is given as a count of 0-1023 so to make the conversion math in the Arduino as simple as possible the idea is to actually set the divider such that the 1023 value corresponds to an input of 20.46 volts. With this value we can calculate the voltage (in 10s of millivolts) by just doubling the count, sneaky hey.

*Again, for efficiency rather than trust the compiler to translate a multiply by 2 into a simple bit shift, I chose to force the point by turning it into a simple self-addition i.e. A+A = 2*A. As I didn't have enough display space to display both decimal points, I add 5 to the result to force a roundup of the last digit, and subsequently leave off the last digit when scaling/inserting the decimal point during the display.*

```
uint16_t Alin = analogRead(1);
// Double Alin to scale result to be integer volts in 0.01V
Alin = Alin + Alin;
// only going to display 1 decimal point so round up
Alin = Alin +5;
```

I also had to make a few truncations to fit in the frequency scale and S and P levels. As implemented here the frequency is displayed in GHZ("G") if the frequency has more than 9 digits and MHZ ("M") if less. Also for the actual value of the S meter (similarly when it is the power meter on TX) I only had space for one character so I chose to display it as a hex value so the display will

show S0 to S9 then rather than some form of S9+ it will go SA through to the maximum of SF. The power level is the same. The bar graph shows the 0-15 levels with a half block resolution. I.e. an S8 will be 4 full blocks. See Figure 6 - Laying Out The Display

Version 1.3 of the software uses only 18% of program storage and 23% of dynamic memory so there is plenty of room left for further development. This is on a 328 (i.e. 32K version) Nano, I haven't tested it but on a 168 (16K) nano these percentages should basically double but should still fit comfortably if you have the cheaper Nano.

Using It.

The only setup required is to set the LCD contrast level and to trim the supply voltage reading. For the contrast the simplest is to just turn it all the way up then just back it off till it looks good. The supply voltage calibration is easiest done by measuring the voltage on the Vin to the nano (eg. the voltage from the FT817d's aux socket) with a known good multi-meter then adjusting the ten-turn pot to have the same voltage displayed on the screen as was read on the multi-meter. As seen in Figure 7 - Works in TX Also it works in TX as well with the supply voltage from the little plug pack that comes with the FT817 dropping down to 11.2 volts even on the lowest power setting.

Basically, otherwise you plug the box into the aux port on the radio and off it goes. One problem is on the 817 the 13.8 is not controlled by the radio power switch, so the display will start up as soon as you supply power to the radio. I have put in a ten second delay to give you time to turn on the radio before the display starts to bombard it with CAT commands, However, if you are a bit slow to turn the radio on, or just for some reason try to turn just the radio off and back on, sometimes (at least with my FT817d) the radio will refuse to power up because presumably it is listening to the CAT port not the power button. Don't worry if this happen to you, you haven't broken anything, just unplug the display and re-plug it in, and all will be fine. I assume the radio is going into some undocumented protection mode having detected CAT traffic at start up, or alternately is waiting for a CAT power up command which is again as far as I know also undocumented. If this is a real problem in your case, then perhaps a separate power switch in between the AUX supply and Vin would be simpler than re-plugging to display in.



Figure 7 - Works in TX Also

What's Next?.

I have lots of plans for extensions to this display the first of which is to use the other pole of the switch to control a relay switchboard to connect the appropriate transverter to the IF (ie. FT817) as I select with the front panel knob. I am waiting for the first version of a PCB back to try this out so expect more parts to follow.

73 Paul VK3DIP

February round up

The monthly meeting was a show and tell with presentations from a number of members, it was great to hear what everyone has been up to and it helps us to appreciate the depth of knowledge and expertise in the club.

The build day on Saturday 17th saw much work done on the spiderbeam at the clubrooms including fixing the balun and replacing the mast that the antenna bolts to. This had a number of very deep grooves worn in it and would have become a point of failure. Many thanks to the team who assisted and those that donated materials. A lunch of schnitzel sandwiches was enjoyed by all.

Advanced classes commenced on Thursday 15th and we have 6 students participating.

On Saturday 24th we ran a BBQ at Eltham bunnings, this produced an excellent result with over \$1900 being raised for your club. Great effort by the team of Anthony, Chris, David, Phil, Craig, John, Peter, Ed and Greg. Many thanks to the members that popped in to have a chat and buy a sausage.

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!
- U1sage privileges are only available to financial NERG members with VK callsigns.

advertisements for inclusion in the newsletter. Please contact the editor at news@nerg.asn.au

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

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/nergamateurl/>

Members are encouraged to join this group