RAGCHEW

MAY 2020

FROM THE EDITOR

Firstly can I thank members who have supplied material for this issue of "Ragchew|" - please keep those articles coming!

Despite the club being unable to meet at Churchdown School, members are staying in touch with each other not only through our well-established evening nets, but also the daily virtual coffee morning and afternoon tea gatherings on 2m FM (145.475MHz if clear)

Tony G4HBV continues with **Part 2** of his series on **"How a Typical HF Antenna System Works"** and in this issue he examines the role of the feeder.

In **Part 2 of "Mr Bunnell's Triumph"** by **Tom G3XMM** describes the early history of the company which bore his name.

John 2E0POE concludes his description of the **Ubitx V6 Multiband QRP transceiver** which he has recently built - this month the final assembly.

In February **John Rowing M0NRZ** gave a very interesting and informative talk at club on the **Arduino Micro-controller** which inspired **Martin Macrae 2E0KZU** to purchase an **Arduino Starter Kit** from **RS Supplies.** Read his review in this issue.

Malcolm G6UGW continues his series reviewing the Radio Spectrum from 300Hz - 300GHz and this month he describes the Long Wave band 30kHz - 300kHz.

I reported in the April "Ragchew" the death of club member **Barry Allen M6UBJ.** His funeral took place on Wednesday 8th April and a video of the Memorial Service can be found on the following link:-

https://www.youtube.com/watch?v=aYQ6a8E_FCw&feature=youtu.be&fbclid=IwAR3H5iLbk71Rty5SKhn0gdtnCSWsWTCjpsNfn8QgMciakFapvr4z08oRXpU

I hope that you and your families are all staying safe and well and that you are finding our wonderful hobby is helping you to cope with the current situation.

73 Brian G4CIB (g4cib@outlook.com)

June 2020 "Ragchew"

COPY PLEASE BY SATURDAY MAY 23rd

Contest Roundup by Brian G4CIB

During the past month a dedicated group of members have been entering both HF and VHF RSGB contests and as a result the club has been progressing well in the results tables.

In the **UKAC VHF** series the club is in **22nd overall position** in the **Local Clubs** table with 70cm entries contributing the most points (187), followed by 2 metres (129), 6 metres (122) and 4 metres (65). These results are thanks to the efforts of **Gary M0XAC (6m, 4m, 2m, 70cm), Dave G4BCA (6m, 4m, 2m, 70cm), Les G0ULH (6m, 4m, 2m, 70cm), Barry M0HFY (2m,), Mike G4IZZ (2m, 70cm) and Graham M0XGL (2m)**. I've managed to contribute to the score on 6m, 2m and 70cm.

For the past few months **Dave G4BCA, Gary M0XAC, Mike G4IZZ, George M0HWT** and myself have been entering the **FMAC** contests which precede their 2m and 70cm UKAC equivalents. As I write this the club is in **5th position** in the **2m Local Clubs** table, and also in **5th position** in the **70cm Local Clubs** table.

In the **80m Club Championship** the club is well placed in **8th** position in the **Local Clubs** table. **Martin G4ENZ** is doing very well having come top of the Data table in February and March, also contributing to club's overall score on CW and SSB. **Bob M0NQN** is obviously a CW and Data fan but he did enter the April SSB contest. Likewise **Gary M0XAC** has stuck with CW and Data until April when he too entered the SSB contest. **Mike G4IZZ** has been entering with CW and SSB and in April submitted a log in the Data contest. **Tony G4CMY** has been exclusively CW, With the encouragement of **Martin G4ENZ** I had a bash in the April Data contest, with just 10 watts on PSK63 I managed 22 QSOs.

As well as RSGB organised contests there are of course many others throughout the world and it would be great if members could share their operating experiences. For my own part I entered the **SP DX Contest** organised by the Polish Amateur Radio Union (PARU). The object was for Polish stations to work countries outside Poland, the exchange being RS(T) and a letter denoting the Province where the station was located and to send to the Polish station an RS(T) report followed by serial number. Using 5 watts and operating for a few hours, I entered the QRP Section clocking up just 17 qsos, mainly on 80m. I wouldn't have sent an entry in with such a lowly score but a "nag-mail" from the PARU encouraged me to submit my log - I'll let you know how I got on when the results are published..

RF NOTES
By Tony G4HBV

All comments refer to a typical system comprising a transceiver, SWR Bridge, ATU, feeder and antenna. Continuing on from the last “RF Notes” in the March “Ragchew”, we turn our attention to the feeder. This can take many forms, ranging from coax to open-wire feeders, but the basic principles remain the same. We consider the feeder to be uniform along its length so that the capacitance and inductance per unit length is constant, being described as “distributed”. To a close approximation these two parameters determine the velocity factor and the characteristic impedance of the feeder. The characteristic impedance is that presented to RF energy being passed along the feeder.

As RF energy from the transceiver passes along the feeder it encounters the antenna connection. If the input impedance of the antenna is exactly the same as the feeder’ characteristic impedance, all of the RF energy is passed to the antenna; any mismatch results in some energy being reflected and passing back down the feeder to the transceiver, forming as it does so a standing wave on the feeder. A standing wave ratio (SWR) is said to exist on the feeder. In the typical HF system under consideration here it is extremely unlikely that there will be no reflection whatsoever. Two points should be noted: SWR on the feeder is ONLY determined by the impedances of the feeder and the antenna input, SWR on the feeder causes the impedance at the feeder input to be transformed from the input impedance of the antenna to a different value. This transforming occurs because reflected energy and direct energy from the transceiver cause the voltage/current ratio to vary along the length of the feeder.

Myths about SWR abound! Arising from this impedance transformation is one that says SWR on the feeder can be changed by varying the feeder length. Other myths have arisen, especially in the roles of the SWR bridge and the ATU and their effect on feeder SWR.

The transformation of the antenna input impedance means that the first generation of antenna analysers do not have the ability to read antenna input impedance accurately. The classic solution was to use a Smith Chart to convert the feeder input impedance to that of the antenna input. The Smith Chart is a fearsome looking chart, though once understood it is easy to solve this particular problem. Any reasonably advanced Radio Engineering book will provide details.

If the feeder is an electrical half-wave long (allowing for the velocity factor) at the operating frequency, then an analyser reading of the feeder input is also that of the antenna input. Second generation antenna analysers, such as the MFJ-226, can be programmed to exclude the feeder from a measurement so enabling it to accurately read the antenna input impedance via measurement on the feeder input.

Finally, a high SWR on the feeder does not mean reflected energy is lost, since eventually reflected energy passes onto the antenna by re-reflection - a continuing process. Figures I have seen suggest less than 1dB caused by a 3:1 SWR under worst case conditions –a value hardly likely to be noticed.

The Radio Spectrum by Malcolm G6UGW

Part 3 - Low Frequency 30kHz - 300kHz

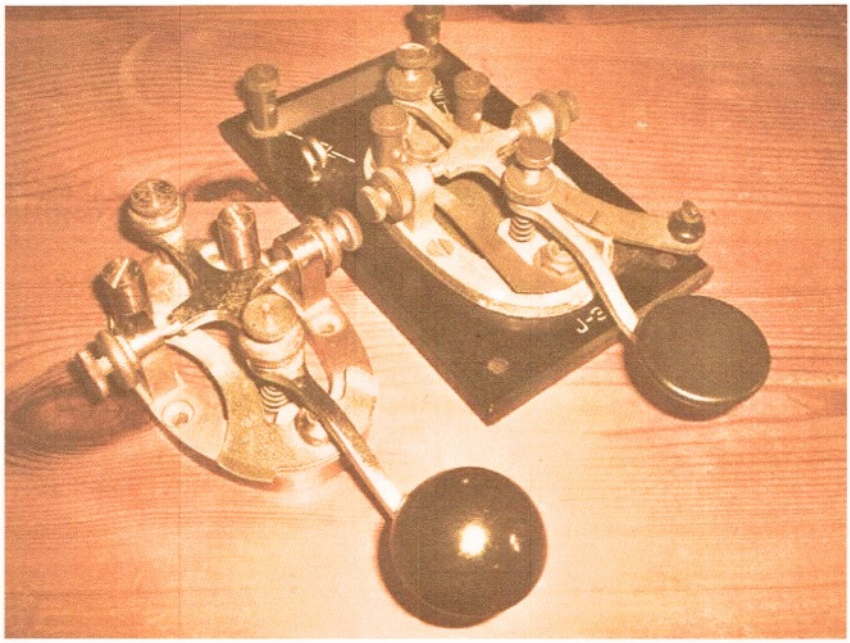
These frequencies correspond to a wavelengths between 10km to 1km. This part of the spectrum covers the Long Wave AM broadcast band e.g. BBC Radio 4 on 198kHz. This part of the spectrum is also used for aircraft beacons, navigation systems e.g. LORAN and weather systems. This band is also used for time signal broadcasts.

(to be continued)

Mr BUNNELL'S TRIUMPH - Part 2

By Tom G3XMM

Following on from the first part of this article, the photograph below shows a J-38 in company with one of its ancestors - and thereby hangs a tale.



Jesse H Bunnell was a professional telegrapher by the age of thirteen and served as such on the Union side during the American Civil War. By his mid-thirties he had founded the company that bore his name and was supplying telegraph equipment to military and commercial customers. Most American telegraph traffic at the time was sent via hand-keyed Morse and a problem was beginning to become apparent Telegraph keys were traditionally made using a brass lever pivoting on a steel axle. The hard life of the telegraph office caused the brass to erode and the lateral movement of the lever thus produced made such a key unsuitable for further professional use.

Something rather better was needed. A solution to the problem was suggested in an 1872 article by Franklin Pope, a highly respected electrical engineer of the time . He suggested that the key lever should be cast in the form of a cross or hollow rhomboid. Nine years later Bunnell's patent application for his key with a steel cruciform lever was drawn up by none other than Franklin Pope. Very interesting – more next time!

Some legendary stories about working at GKA (Portishead Radio) - Part 1

Submitted by Andrew G4IVD

Probably the most legendary story concerns the former Chairman of Cunard, Sir Basil Smallpeice. On a typically busy Christmas Day back in the 1970s, he rang GKA to place a call to the QE2. In those days, Christmas Day R/T bookings were made weeks in advance, and it was rare for calls placed ‘on the day’ to be accepted. The phone conversation went along the lines of:

SMALLPEICE: I would like to place a call to the QE2 please.

GKA: I am sorry but all available calls to the vessel have been booked.

SMALLPEICE: But I need to speak to the Captain urgently.

GKA: Sorry but we cannot accept any more calls for the vessel.

SMALLPEICE: Do you know who I am?

GKA: No. Who are you?

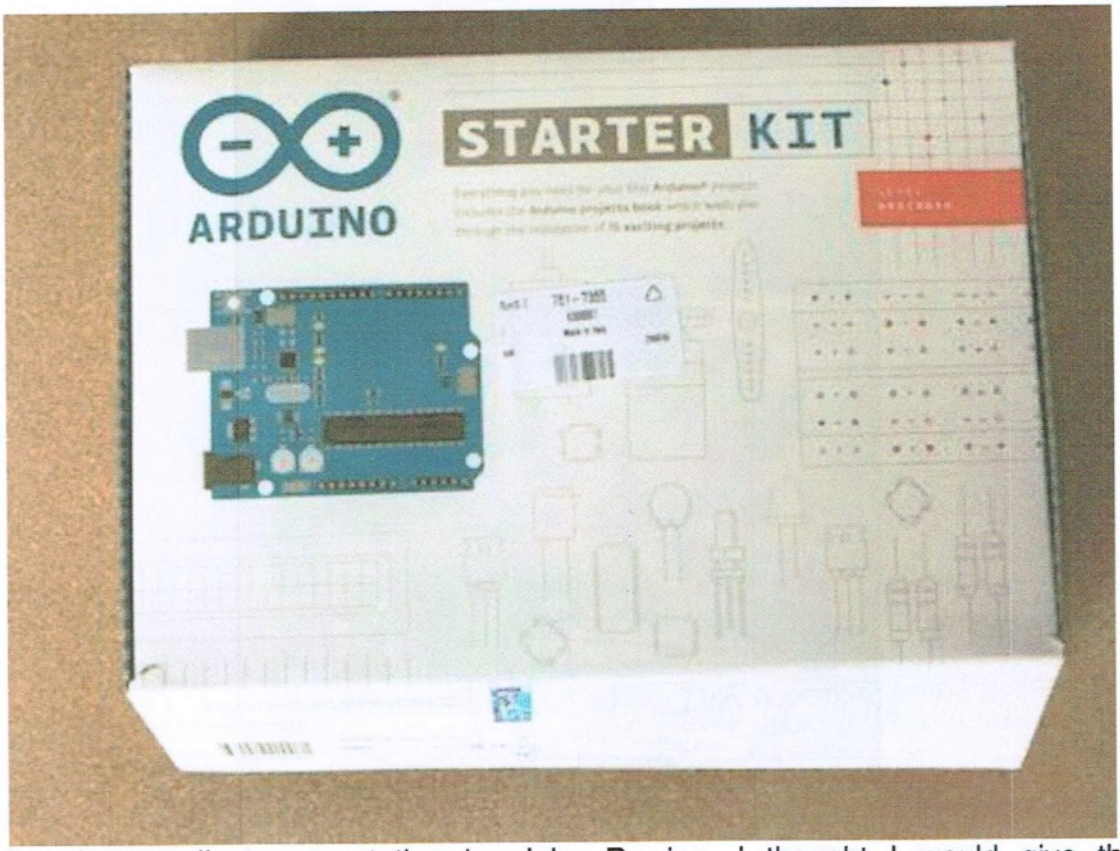
SMALLPEICE: I am Sir Basil Smallpeice, Chairman of Cunard.

GKA: I don’t care if you are Sir Basil ***** Brush, you still can’t have your call! (Click)

A few days later a letter of complaint was received at the station in which Sir Basil accepted why he could not place his call, but he did take exception about being compared to a furry rodent.

More next month!

Arduino Uno DIP V3 Arduino Starter Kit K000007 RS Supplies.
Stock No 761-7355
By 2E0KZU



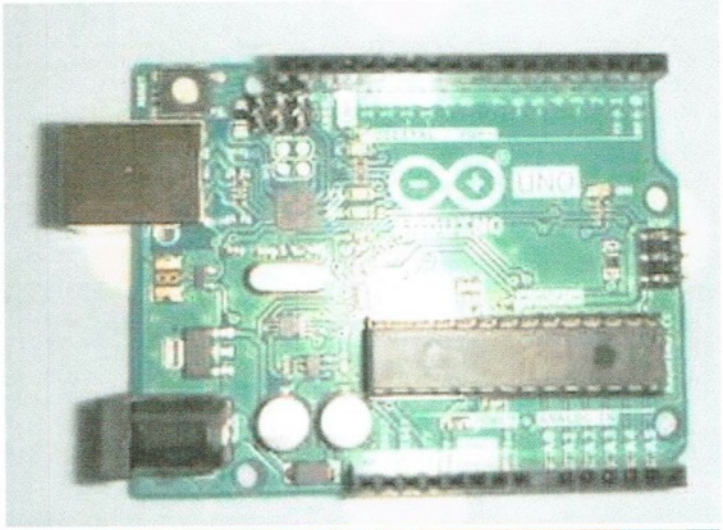
After the excellent presentation by John Rowing, I thought I would give the ARDUINO a try. For those who are not familiar with programming, the RS Supplies starter kit has everything needed to get going without blowing it up.
The instruction book explains how to download the application and connect your PC or laptop via a USB lead (supplied) to the ARDUINO UNO. I find getting things connected and working properly is usually the most frustrating, but the book explains how to download the application for your laptop or pc, select a port a with a simple test to make a flashing light on the ARDUINO board. If that works you are up an running,
The kit supplies a large number of small components, jumper wires, motors and other bits to construct ten different projects to show you how to uses the connectivity of an ARDUINO. I found the kit parts useful in making my own gadgets without overloading the USB as a source or drain current supplier from the laptop or pc. After the program is loaded, it can be powered by any USB power supply or a 9Volt PP9 battery, the battery connector is supplied in the kit.

The components are supplied in separate boxes, which I spread out in a larger tray so I can find all the bits easily.

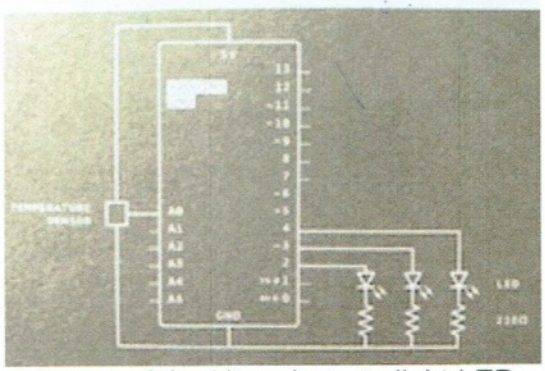
The RS Kit ARDUINO board is the UNO , with connectors supplied that can fit all the sockets on the board, no need to look around to get a compatible type. Most are re-usable. The UNO board is screwed to the supplied orange plastic base, then the breadboard is fixed with double sided tape. So I can change this , I only exposed a small bit of the sticky back on the breadboard, so I can pull it off if i need to. If you expose all of it is is well and truly stuck down . After testing out with the breadboard, at just £16, one could buy another ARDUINO UNO and use that for the final working model.

Project functions include:
flashing LDS's variable colour LED's, thermal control of LED's, servo control, acoustic control of devices, a musical keyboard, using built in timer, motor control, writing text to an external LCD (supplied), analog input to control counters and timers, control a program on your computer from the ARDUINO UNO.

All programs for the projects are printed in the book and included in the application library as files, there are many other examples in FILE/EXAMPLES
There is a quad relay board from RS to handle larger current loads.
RS stock no 875-0292

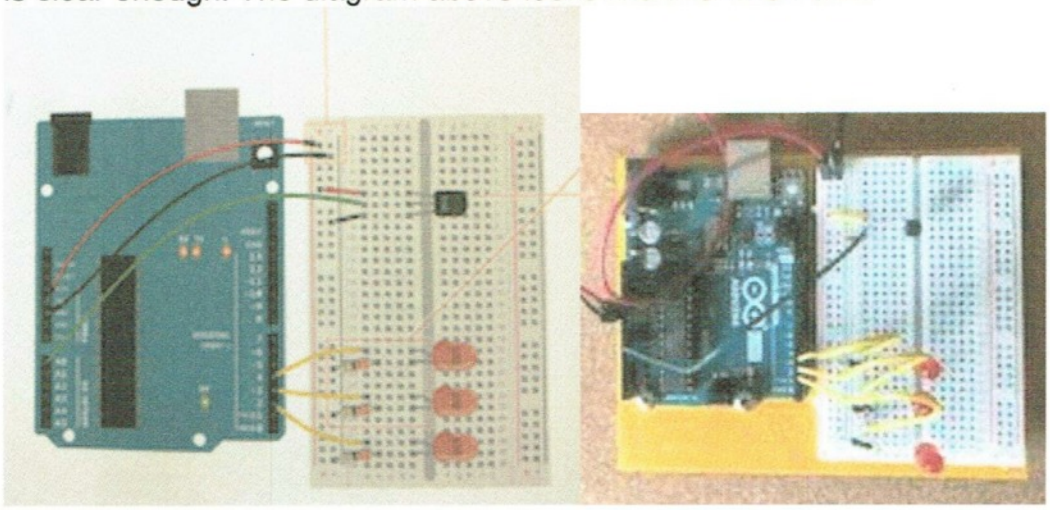


The book describes how to place components for each project with a diagram and a circuit diagram for a novice to do,
I would expect most of us are familiar with resistors and wires etc and would solder up a permanent project after the breadboard test. A masthead controller to switch arial lengths would be possible. As John Rowing explained, there is no operating system it just runs when switched on.



The above diagram is one of the kit projects to light LEDs depending on the temperature sensor.

Some of the kit jumper wires are coloured differently from the book for the equivalent lengths and some of the transistors are slightly different from the sketch, but polarity is clear enough. The diagram above looks like this when built.



The ARDUINO application can be downloaded for Apple OSx, Linux or Microsoft PC. The code is written in the 'C' language for ARDUINO, The setup() always runs first, then the loop() bit runs after that, code outside these routines would be mainly variable declarations etc.

HEAT

```
const int sensorPin = A0;
const float baselineTemp = 15.0;
void setup() {
  Serial.begin(9600);  // open serial port
  Serial.print("R  E  S  T  A  R  T  again from ");
  Serial.print(baselineTemp);
  Serial.print(" \n ");
  for(int pinNumber = 2; pinNumber < 5; pinNumber++) {
    pinMode(pinNumber, OUTPUT);
    digitalWrite(pinNumber, LOW);
  }
}
void loop() {
  int sensorVal = analogRead(sensorPin);
  //Serial.print("Sensor Value:  ");
  //Serial.print(sensorVal);
  //convert the ADC reading to a voltage
  float voltage = (sensorVal/1024.0) * 5.0;
  //Serial.print(", Volts: ");
  //Serial.print(voltage);
  //Serial.print(", degrees C: ");
  //convert the voltage to temp in degrees
  float temperature = (voltage - .5) * 100;
  //Serial.print(temperature);
  //Serial.print("\n");


  if(temperature < baselineTemp + 3 ) {
    digitalWrite(2, LOW);
    digitalWrite(3, LOW);
    digitalWrite(4, LOW);

  }else if(temperature >= baselineTemp+2 && temperature < baselineTemp+4){
    Serial.print("Sensor Value:  ");
    Serial.print(sensorVal);
    Serial.print(", Volts: ");
    Serial.print(voltage);
```

Example : Part of C program to make 3 led's respond to temperature changes

In this example,I played around with variable baseleineTemp variable to get the led's to change. I altered the original quite a lot to make the serial display work better than the example, hence lines are commented out //.
After writing code ,or just using an example, it is checked by the program when you click the arrow at the top, if it compiles, it is passed to the ARDUINO and runs each time it is switched on, it does not have to be connected to your computer any more.If it doesn't compile, there are fairly good error messages to let you know what needs re-working. As soon as you pass another program to the ARDUINO it overwrites the previous one and runs it, so you need to keep a library of your programs on your computer, managed within the application. I think there is a finite size to the code allowed and it is not that big, so limits the number of comment lines you can add.
You may be familiar with the "C" program language, if not, then I recommend a book:

The C Programming language, Prentice Hall, ISBN: 0-13-110362-8.

The example above was modified to have the ARDUINO board return to the computer the temperature values as they changed by writing to the serial port.Code examples can be copied, edited and saves as required on your computer.

I liked the kit because it had compatible components for the ARDUINO so that I didn't overload it.

Cut/paste links into a browser to locate the RS supplies kit

https://uk.rs-online.com/web/p/products/7617355/?cm_mmc=en-ds-_-web-_-ds:inspiration:technology-hub:arduino:a-novice-s-introduction-to-arduino-2_bp-_-7617355

RS Supplies: https://uk.rs-online.com/

Martin Macrae 2E0KZU

Addendum - NOTE:

ARDUINO Program storage space. Maximum is 32256 bytes on board.

ARDUINO Dynamic memory. Maximum is 2048 bytes on board. (which is a bit small)

Net Topics by Brian G4CIB

A comment recently made by **Gary M0XAC** during one of our on-the-air gatherings triggered me to look back through my old log books. He mentioned that as well as all the recent net initiatives we mustn't forget the oldest established club net - namely the one hosted by **Tony G4HBV** on Wednesday evenings using the club call **G4AYM/P.** During my SWL days and into my Class B days (as G8CIB) I, along with many others I suspect, listened on 160m ("Top Band") on a Sunday morning to **G3CGD John** from Cheltenham sending slow Morse followed by a local net. Indeed in the 1960s/70s Sunday morning Top Band nets throughout the UK were the "norm". As **Tony G4HBV (then G8LRJ), Steve G4HFT (then G8HFT)** myself and a few others obtained our Class A licences we aspired to get on Top Band and the first record I have of joining a net on this band was Sunday 9th March 1980 along with **Steve G4HFT, Charles G2DAD** (who lived in Upton St Leonards)**, Tony G4HBV/A** (operating form his parent's house in Hucclecote), and **G4CLR Ian.** My log book records that the net started at 11.05 GMT and finished at 12.00 GMT. Speaking to Tony about this, he reminded me that several stations were crystal controlled so a bit of tuning around was involved. For the the record I was using an HRO receiver and a KW160 AM transmitter running 10 watts into an end-fed wire, and at the time Leta and I were living in Longhope.

Building the Ubitx V6 Multi Band QRP Transceiver

Part 2 - Final Assembly

In the 2nd and final part of his article, John 2E0POE details the final assembly and provides the links detailing the alignment and programming of the transceiver he recently built.

5) **Fixing the Knobs on the Volume & Tuning Pots.**

I used a piece of scrap card I had lying around to use as a spacer and cut a slot in it to fit over the pot pole this was so that the knobs did not rub against the outer case and moved freely. There is a small grub screw in each knob that you will have to loosen so you can fit the knobs on the pot poles. Turn the volume pot to the off position anti clockwise as this is also your on and off as well as volume. Put the knob on the volume pole with the flat edge of the pole inline with the grub screw. Screw down grub screw against the flat edge of the pot tightly with a screwdriver.

Repeat with the process with the Tuning knob but put the flat edge of the pot pole level at the top this will also make it easy to tighten up the grub screw against the flat edge as you will be working from above. See Pictures Below.

6) **Fixing the USB to the back case panel**

Before fitting the back panel to the rest of the case.

First fit the USB cable to the back of case using 2 M3 x 8 Bolt with CSK Head

Then Plug in the USB to the Raduino USB socket.

This is so you can connect the Ubitx via a PC for programming the Ubitx with software updates. Next mount the back of the case on to the main case using 4 M3 x 8 Bolt with CSK Head. Then using the large nut screw the BMC Antenna socket to the outer case see pictures below.

7) **Attatching the the Speaker to the top cover.**

Using 4 M3 nuts & 4 M3 x 8 Bolt with CSK Head fix the speaker to the lid of the case and then connect the speaker cable to the top right hand corner 2 pin connector. Finally using 4 M3 x 8 Bolt with CSK Head fix the Lid down to the case and the Ubitx Build is complete ready for Alignment Prior to first use. See pictures below.





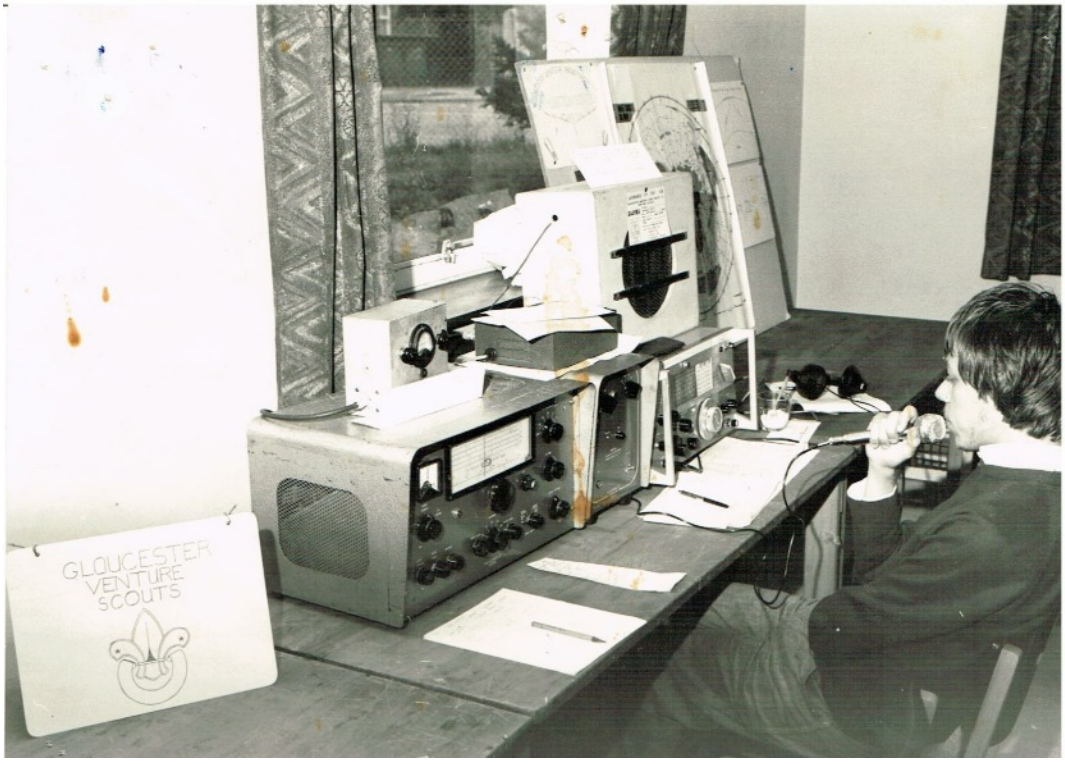
For Alignment please visit the link below to the video by Ashhar Farhan.
https://www.youtube.com/watch?v=t6LGXhS4_O8

For programming please visit the link below to the video by Ashhar Farhan.
https://www.youtube.com/watch?v=3n_V3prSJ_E&t=19s

Building the Ubitx V6 Multi Band QRP Transceiver by John F Williams De 2E0POE
March 2020

From The Archives

The occasion is the Three Towns Dinner - a joint function attended by members of the Gloucester, Cheltenham and Stroud clubs. The location is the Mercers Hall, on the corner of Cross Keys Lane and Mercers' Alley and which is now the Gloucester Masonic Hall. Bottom left (and out of focus) is **Stan Kelly G3COZ** who for many years taught the RAE at Cheltenham. In the centre behind the candlesticks is **Pat G3MA,** to his right **Olive** his XYL and on her right **Tony Kingscote -** our Chairman for many years and to his right, his wife . Some confusion over the date - the caption in the album says 1948, on the reverse of the photo is written 1950.



Steve G4HFT operating the Jamboree-on-the-Air station at the Gloucester Scout HQ at Murray Hall, Tuffley. The caption in the album says it was taken in 1977.